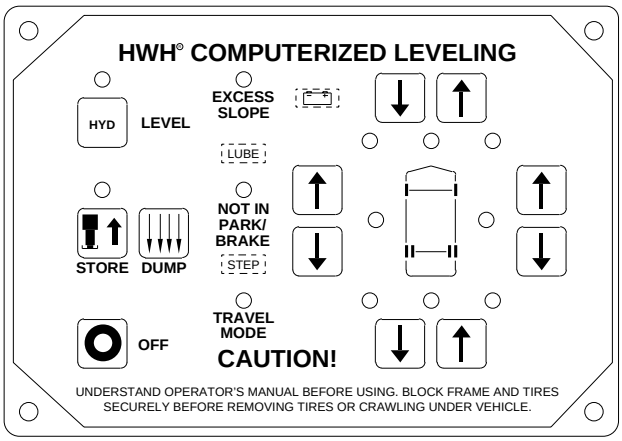
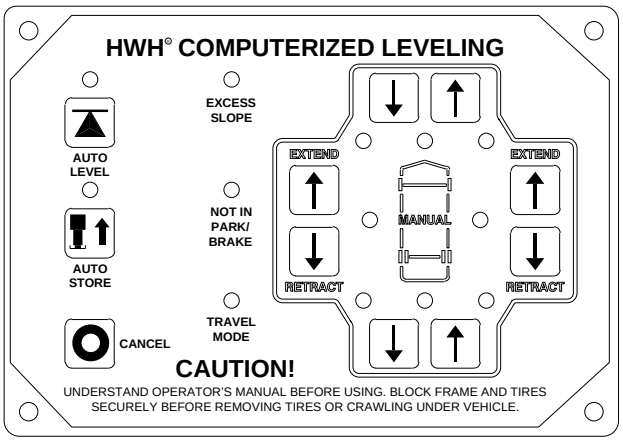
# COMPONENT SELECTION AND INSTALLATION MANUAL

## HWH COMPUTER-C0NTROLLED LEVELING SYSTEM 625 OR 625 SINGLE STEP FOR MOTORIZED VEHICLES

**625 TOUCH PANEL**




**625S SINGLE STEP TOUCH PANEL**

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**ML44818/MP04.2527**
**17JUN09**

# COMPONENT SELECTION AND INSTALLATION MANUAL
# HWH HYDRAULIC LEVELING JACKS
# 625 OR 625S SERIES LEVELING SYSTEMS

THE FOLLOWING INFORMATION IS OFFERED AS SUGGESTIONS ONLY. VARIATIONS IN VEHICLE DESIGN, CHASSIS, SUSPENSIONS, TIRES AND COACH WEIGHTS MAKE IT IMPOSSIBLE TO ANTICIPATE AND ADDRESS ALL SELECTION OR INSTALLATION PROBLEMS AND POSSIBILITIES. SOME VEHICLE BUILDERS OR CHASSIS BUILDERS MAY USE PRACTICES DIFFERENT FROM THOSE IN THIS MANUAL. CONSULT HWH CORPORATION OR THE VEHICLE BUILDER FOR INFORMATION CONCERNING CORRECT SYSTEM CAPACITY AND TYPE FOR THE VEHICLE, INSTALLATION QUESTIONS, AND INSTALLATION OF OTHER HWH EQUIPMENT.

ONLY QUALIFIED TECHNICIANS SHOULD INSTALL OR REPAIR LEVELING SYSTEMS ON VEHICLES. A KNOWLEDGE OF HYDRAULICS, WELDING, THE VEHICLE'S SUSPENSION AND ELECTRICAL SYSTEM, AS WELL AS AN UNDERSTANDING OF THE LEVELING SYSTEM'S HYDRAULICS AND ELECTRONICS IS REQUIRED.

**NOTE - HWH Corporation assumes no liability for damages or injuries resulting from the installation of this product.**

## WARNING !

**READ THE ENTIRE INSTALLATION PROCEDURE BEFORE STARTING INSTALLATION.**

**BLOCK FRAME AND TIRES BEFORE CRAWLING UNDER VEHICLE. DO NOT USE LEVELING JACKS OR AIR SUSPENSION TO SUPPORT VEHICLE WHILE UNDER VEHICLE OR CHANGING TIRES. VEHICLE MAY DROP AND/OR MOVE FORWARD OR BACKWARD WITHOUT WARNING CAUSING INJURY OR DEATH.**

**DO NOT TURN ON POWER UNTIL INSTALLATION IS COMPLETE.**

**WHEN ROUTING HYDRAULIC HOSES AND WIRES, BE SURE THEY ARE NOT EXPOSED TO ENGINE EXHAUST OR ANY HIGH TEMPERATURE COMPONENTS OF THE VEHICLE.**

**KICK-DOWN JACKS MAY ABRUPTLY SWING UP WHEN THE FOOT CLEARS THE GROUND OR WHEN JACK REACHES FULL EXTENSION.**

**NEVER PLACE HANDS OR OTHER PARTS OF THE BODY NEAR HYDRAULIC LEAKS. OIL MAY PENETRATE THE SKIN CAUSING INJURY OR DEATH.**

**SAFETY GLASSES ARE TO BE WORN TO PROTECT EYES FROM DIRT, METAL CHIPS, OIL LEAKS, ETC. FOLLOW ALL OTHER APPLICABLE SHOP SAFETY PRACTICES.**

**DO NOT OVER EXTEND THE REAR JACKS. IF THE WEIGHT OF THE VEHICLE IS REMOVED FROM ONE OR BOTH REAR WHEELS, THE VEHICLE MAY ROLL FORWARD OR BACKWARD OFF THE JACKS.**

**MP14.0012**
**17JUN09**

# SECTION I
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT SELECTION

**This manual is designed to aid in the selection of the correct jacks or mounting brackets and the installation of the leveling system components including mounting brackets and/or jacks, pump/manifold control units, touch panels, harnesses and hoses.**

**O.E.M. and specialty installers working with vehicles that incorporate HWH room extension mechanisms should work directly with HWH Corporation to determine total room and leveling system requirements.**

**It is important to carefully read both sections of the manual before ordering or installing components. The information in the first section, Component Selection Guide, will aid you in obtaining the necessary information needed to order systems or system components. The second section, Installation Guide, will discuss installation of components including: mounting heights and locations, welding procedures, hose and harness routings, pump mounting, and adjustments including level sensing unit adjustments, jack adjustments and jack pressure switch adjustments.**

**Failure to read and understand this manual may result in ordering the wrong components which will delay the installation or possibly cause improper installation of system components which may cause improper system operation or component failure.**

## SECTION I: COMPONENT SELECTION

HWH has information available to aid in the selection of system components for many of the more common applications. This information is available on the HWH web site at www.hwh.com. The information can be printed off or downloaded as necessary. In the **"Product Information"** section on the HWH home page, there is a link to **"Standard Leveling Systems"** and **"Custom Leveling Systems (Matchmaker)".** The **"Standard Leveling Systems"** link has information for ordering complete leveling systems for several different chassis or vehicle options. These systems are somewhat generic in nature, designed for different chassis types and some special vehicles. The **"Matchmaker Program"** is designed to help select components for specific vehicles, mainly motor homes. In the **"Online Installation School"** section, you can link to the **"Jack Mounting Bracket Catalog" (ML10049).** This catalog contains information and diagrams to aid in selecting kick-down style jack mounting brackets or straight-acting jack assemblies. The catalog has specific or generic information but most of the information is not vehicle specific. This catalog only has information about mounting brackets or jack assemblies. Information about control systems, hoses or other system components can be obtained in the **"Matchmaker Program",** the **"Standard Leveling Systems"** link on the HWH web site or by contacting HWH Corporation directly.

**Kick-Down or Straight-Acting jacks.** Basically, this is a matter of personal preference but due to available mounting locations or mounting space and height requirements, certain vehicles will not accommodate the straight-acting jacks. Straight-acting jacks provide somewhat better stability and are typically used if the vehicle has a room extension. The kick-down style jacks offer a drive-off feature in case of a retract failure or in the event you forget to retract the jacks. Straight-acting jacks are also preferable on vehicles with an air suspension

**WARNING: DO NOT CRAWL UNDER A VEHICLE WITHOUT PROPERLY SUPPORTING THE FRAME OF THE VEHICLE IF THE VEHICLE IS SUPPORTED ON THE SUSPENSION AIR BAGS. THE VEHICLE WILL RAPIDLY DROP SEVERAL INCHES WHEN THE AIR IS EXHAUSTED FROM THE AIR BAGS. MAKE SURE THERE IS ADEQUATE CLEARANCE TO WORK UNDER THE VEHICLE WITH THE AIR BAGS DEFLATED.**

HWH Corporation has numerous pivot bracket/jack arrangements in all jack capacities. If a pivot bracket/jack arrangement available in our **Jack Mounting Bracket Catalog,** the **Matchmaker Component Selection Program** or the **Standard Leveling System** link is not suitable for your application, Contact HWH Corporation for assistance in selecting an appropriate pivot bracket/jack arrangement. The following information is needed to assist us in this selection process.

1.) Coach make, model and year.
2.) Chassis manufacturer and model
3.) Spring or air suspension.
4.) Front and rear axle weights. (Actual not GVW)
5.) Tire size. (Height 19.5", 22.5" etc.)
6.) Frame rail height
7.) Distance from ground to bottom of frame rail. If the vehicle has an air suspension, measure with air bags empty if possible.)
8.) Distance from bottom of frame rail to floor or main vehicle platform.
9.) Available mounting area. (Refer to the Clearance and Mounting Dimension Chart- - -Straigt-acting jacks)
10.) Tag Axle?

# SECTION I
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT SELECTION

The following chart shows the available capacities for kick-down and straight-acting jacks:

| Weight capacity | 3,000# | 4,000# | 6,000# | 9,000# | 12,000# | 16,000# | 24,000# |
|---|---|---|---|---|---|---|---|
| Kick-down style | | | X | X | | X | X |
| Straight-acting style | X | X | X | X | X | X | X |

**To select the proper components for your application, especially when selecting mounting brackets and/or jacks, the vehicle must be available for inspection. Ordering system components without first inspecting and measuring the vehicle for critical component mounting and location information may result in receiving components that may not work properly for your application.**

Refer to the **"CLEARANCE AND MOUNTING DIMENSION CHART"** in PART I of this manual for information needed to check available mounting locations for adequate clearance to mount and operate the jacks. Refer to the **"Jack Mounting Bracket Catalog (ML10049)** located in the HWH **Online Installation School** for specific information concerning bracket and mounting dimensions or jack / mounting bracket locations on frames. Information in this catalog is mainly vehicle generic in nature and is primarily used in aftermarket installations, O.E.M. installations will usually be more vehicle specific. O.E.M.s should contact HWH sales or engineering for specific information or drawings.

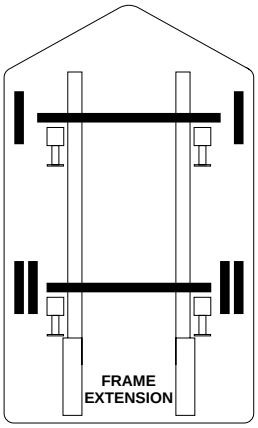
**Use the combined information from the charts in PART I and the Bracket Catalog to determine a proper mounting location with adequate mounting and operational clearance before ordering equipment.** Remember, operational clearance includes mounting heights. HWH offers kick-down and straight-acting jacks in different stroke capabilities. Use the charts and the catalog to determine which stroke jack is needed for your application.

**Vehicles with spring suspensions.** The ground clearances listed in the Dimension Charts apply to vehicles with a full load of fuel, water and equipment. If the vehicle is empty, typically 1 inch should be added to the listed dimensions. Also, if the vehicle is new, the vehicle may settle down 3/4 of an inch or more in the first year or 10,000 miles.

**Vehicles with air suspensions.** Typically, straight-acting jacks are used on vehicles with an air suspension. If the vehicle is at normal ride height when mounting heights are set, you must remember the chassis will lower between 2 and 3 inches when the suspension air bags are emptied. Ground clearances listed in the Dimensions Charts are typically figured with the suspension air bags empty. If possible measure the difference between the bottom of the frame and the ground with the vehicle at normal ride height and with the bags empty. This dimension is how far the vehicle will lower when the air bags are exhausted. Add this dimension to the suggested ground clearance listed for the jacks in the dimension charts. Example: A 13" stroke jack is typically mounted with 7 to 9 inches of ground clearance. A vehicle with an air suspension drops 3 inches from normal ride height when the suspension air bags are emptied. The typical ground clearance for this installation should be 10 to 12 inches with the vehicle at normal ride height.

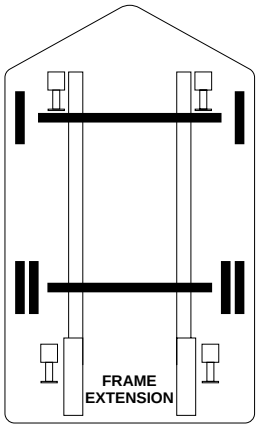
The correct mounting location for the jacks is important for the proper functioning of the leveling system and to reduce stress to the vehicle while leveling. Refer to Figures 1 thru 4 for typical, non-typical, not suggested and unacceptable mounting configurations. Figures 3 and 4 refer to kick-down style jacks only.

**SWING TO REAR**



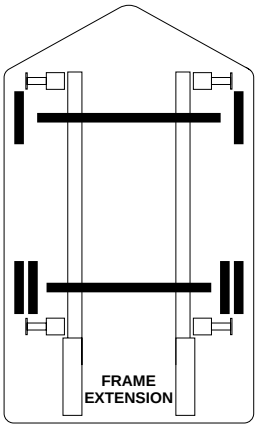

**TYPICAL**
**Figure 1**

**SWING TO REAR**



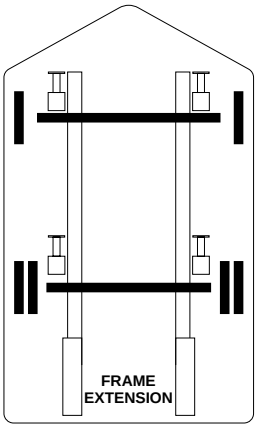

**NON - TYPICAL**
**Figure 2**

**SWING SIDEWAYS**




**NOT SUGGESTED**
**Figure 3**

**SWING FORWARD**



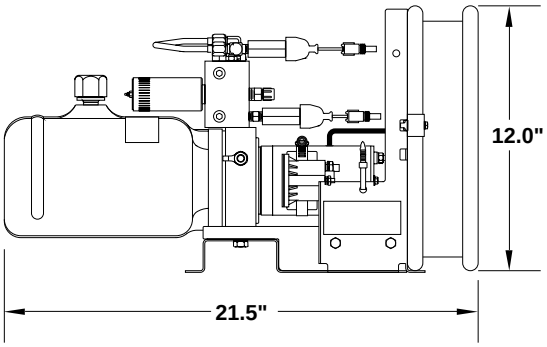

**UNACCEPTABLE**
**Figure 4**

# SECTION I
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT SELECTION

**System Controls, Hoses and Harnesses.** Components such as control systems used for after market installations on motor homes are predetermined by HWH once the type of vehicle and jacks are determined. There are generic hose kits and harnesses for class C and class A vehicles. The control systems and power unit / control box assemblies are determined by the type of chassis and the jacks used with the installation. O.E.M. or specialty installers should contact HWH for specific control system, power unit / control box assemblies, hose and harness information. There are different size pump / motor / tank assemblies available if mounting space is limited. For class C vehicles, the control box assembly can be removed and mounted in a remote location. The harness allows the control box to be moved about 3 feet from the power unit assembly. The following dimensions show how much space is needed to mount a standard power unit assembly for class C and class A style vehicles.

## Standard Class C Power Unit / Control Assembly

**Side View**




**Top View**

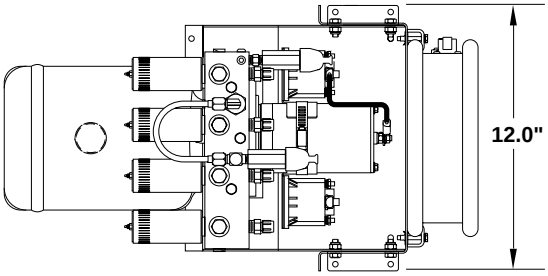
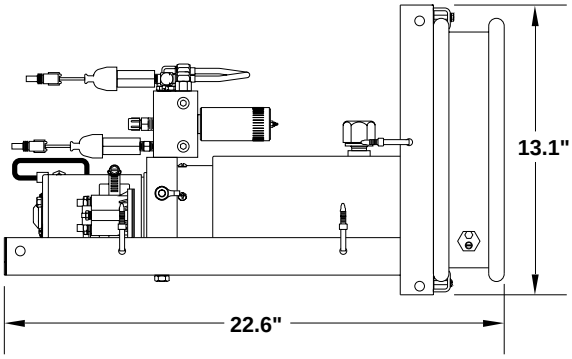



**Figure 5**

## Standard Class A Power Unit / Control Assembly

**Side View**




**Top View**

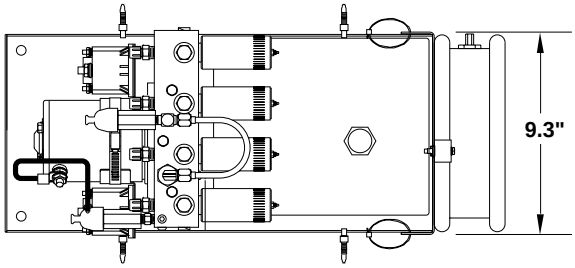



**Figure 6**

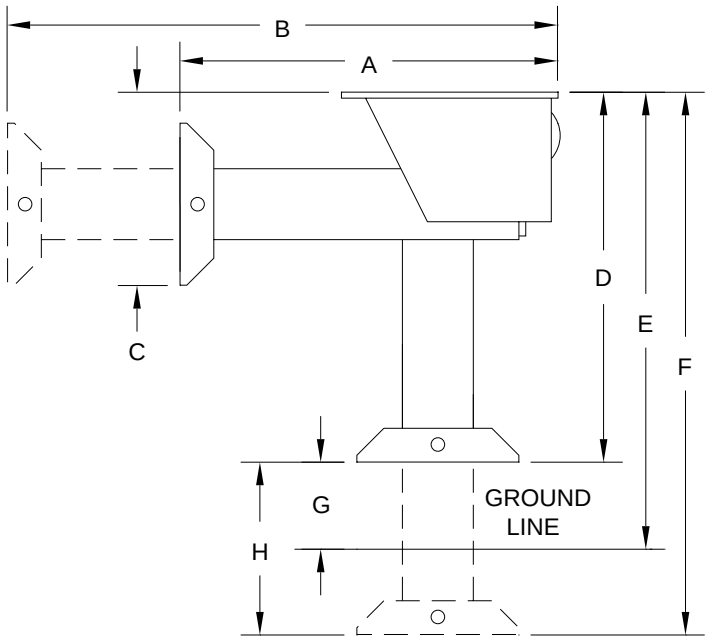
The standard class C style power unit / control assembly is typically used with systems that incorporate 6,000# capacity jacks and smaller. The standard class A style power unit / control assembly is typically used with systems that incorporate 6,000# jacks and larger. Examples: The class C power unit would be used with a system that has four 6,000# jacks or a system with two 4,000# and two 6,000# jacks. The class A power unit would be used with a system that has two 6,000# and two 9,000# jacks. **If the above dimensions do not allow the installation of the power unit / control assembly, contact HWH Corporation for other options. Remember, the control box can be moved from the class C style power unit / control assembly.**

**Air Suspension Air Dump System.** If the vehicle is equipped with an air suspension, an air bag air dump system is needed. Some vehicles will be equipped with a pilot air dump system. Most likely, if a pilot air dump system is used, there will be a dump switch or button supplied by the chassis manufacturer. If the chassis has no air dump system, an HWH air dump system will have to be used. This will have electrically controlled solenoid valves, a different touch panel, different control box and necessary harnesses. Contact HWH with specific chassis information to obtain the proper air dump kit.

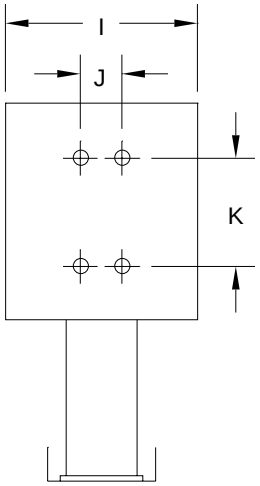
**Due to variations in chassis's, vehicle construction and vehicle equipment, typical systems, mounting brackets and components offered by HWH may not fit every application, even when a specific application is listed. It is the installers responsibility to address mounting requirements and issues before starting the installation. When variations are encountered that require custom brackets or components, or typical mounting locations are not available, contact HWH Corporation for assistance.**

# SECTION I
# CLEARANCE AND MOUNTING DIMENSION CHART
# KICK - DOWN JACKS

SIDE VIEW




TOP VIEW



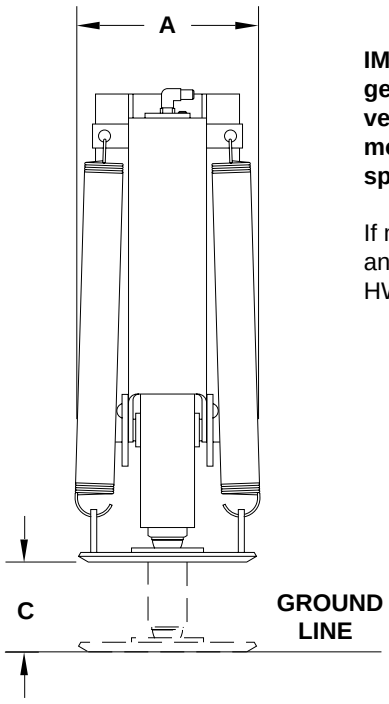

DIMENSION "I" INCLUDES SPRINGS.

| JACK | RETRACTED DIMENSIONS | | | EXTENDED DIMENSIONS | | | | STROKE | MOUNTING WIDTH | MOUNTING BOLT PATTERN | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K |
| 6000# SHORT | 12.5" | 19.5" | 4.5" | 12.0" | MIN 14.0" MAX 16.0" | 19.0" | MIN 2.0" MAX 4.0" | 7.0" | 6.5" | 1.5" | 4.5" |
| 6000# TALL | 14.0" | 22.0" | 4.5" | 13.5" | MIN 15.5" MAX 17.5" | 21.5" | MIN 2.0" MAX 4.0" | 8.0" | 6.5" | 1.5" | 4.5" |
| 9000# SHORT | 14.5" | 23.0" | 6.5" | 13.5" | MIN 16.5" MAX 18.0" | 22.0" | MIN 3.0" MAX 4.5" | 8.5" | 8.5" | 1.5" | 4.5" |
| 9000# TALL | 15.5" | 24.5" | 6.5" | 14.5" | MIN 17.5" MAX 19.0" | 23.5" | MIN 3.0" MAX 4.5" | 9.0" | 8.5" | 1.5" | 4.5" |
| 16000# | 18.0" | 26.0" | 7.0" | 16.75" | MIN 19.75" MAX 21.25" | 24.75" | MIN 3.0" MAX 4.5" | 8.0" | 12.5" | 4.0" | 4.0" |

Dimension E is the suggested mounting height.
Dimension G is the suggested ground clearance when the jack is vertical but not extended.
* If using kick - down jacks on vehicles with full airbag suspensions, add 2 inches to this dimension.

# SECTION I
# CLEARANCE AND MOUNTING DIMENSION CHART
# STRAIGHT ACTING JACKS WITH SINGLE ACTING CYLINDERS

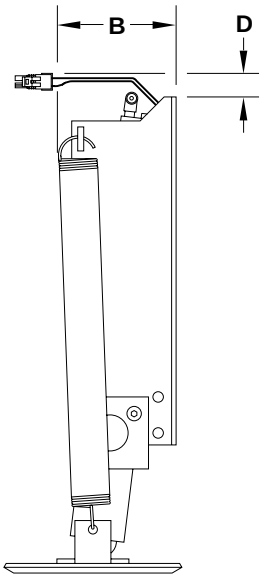
FRONT VIEW




**IMPORTANT: Dimensions listed here are for typical generic style jacks installed in the after market. For vehicle specific jacks, contact HWH Corporation for mounting and clearance dimensions or drawings of specific jacks.**

If needed, jacks with different mounting dimensions and spring arrangements may be available. Contact HWH Corporation for information.

SIDE VIEW




* If the vehicle is equipped with an air suspension that will be dumped, add a minimum of 2" to the ground clearance dimension. For new and or unloaded vehicles with spring suspension, add a minimum of 1" to the clearance dimensions to allow for settling of the vehicle.

| JACK CAPACITY AND STROKE | MOUNTING WIDTH A | B | GROUND CLEARANCE C * | TOP CLEARANCE D ** |
|---|---|---|---|---|
| 3,000# x 13" STROKE | 8.00" | 3.75" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 4,000# x 13" STROKE | 8.00" | 4.75" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 6,000# x 13" STROKE | 8.00" | 5.00" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 6,000# x 16" STROKE | 8.00" | 5.00" | 10.00" MIN. - 12.00" MAX | 2.00" |
| 9,000# x 13" STROKE | 8.50" | 5.50" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 9,000# x 16" STROKE | 8.50" | 5.50" | 10.00" MIN. - 12.00" MAX | 2.00" |
| 12,000# x 13" STROKE | 10.00" | 6.00" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 12,000# x 16" STROKE | 10.00" | 6.00" | 10.00" MIN. - 12.00" MAX | 2.00" |
| 16,000# x 13" STROKE | 12.00" | 6.50" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 16,000# x 16" STROKE | 12.00" | 6.50" | 10.00" MIN. - 12.00" MAX | 2.00" |
| 24,000# x 13" STROKE | 13.25" | 7.50" | 7.00" MIN. - 9.00" MAX | 2.00" |
| 24,000# x 16" STROKE | 13.25" | 7.50" | 10.00" MIN. - 12.00" MAX | 2.00" |

** This is figured from the highest point of the cylinder or component mounted to the top of the cylinder. If the hose comes into a straight fitting, 6 to 8 inches of clearance may be needed.

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

## 1.) PRE - INSTALLATION CHECKS

**THESE ARE ITEMS THE INSTALLER SHOULD CHECK BEFORE STARTING THE INSTALLATION:**

1.) Do the jacks have the proper lifting capacity for the axle weights of the vehicle?
2.) Do the jacks have the proper stroke for the mounting heights available?
3.) Does the pump have the proper reservoir capacity for the jacks being used?
4.) Are acceptable mounting locations available for the jacks and other system components?
5.) Will the mounting brackets or jacks interfere with any vehicle components or structure?
6.) If the vehicle is equipped with an air suspension, an air dump system must be used for proper leveling. If the vehicle is not equipped with an air dump system, an air dump system must be installed. Contact HWH Corporation for assistance.
7.) Are all components necessary for the installation, including mounting brackets, hardware kits, hoses, etc. present? Do not start the installation only to find the touch panel is missing.
8.) Any vehicle exhaust modification that needs to be done should be done before the installation is started.
9.) Does the vehicle have a good set of batteries that are fully charged?

**IMPORTANT: Jacks used with 625 or 625S series leveling systems need a pressure switch on each jack. Generic jack kits may not come equipped with pressure switches. Make sure the appropriate jack pressure switches have been ordered and are present for the installation.**

**NOTE:** Do not use kick-down style jacks and straight-acting jacks on the same vehicle.

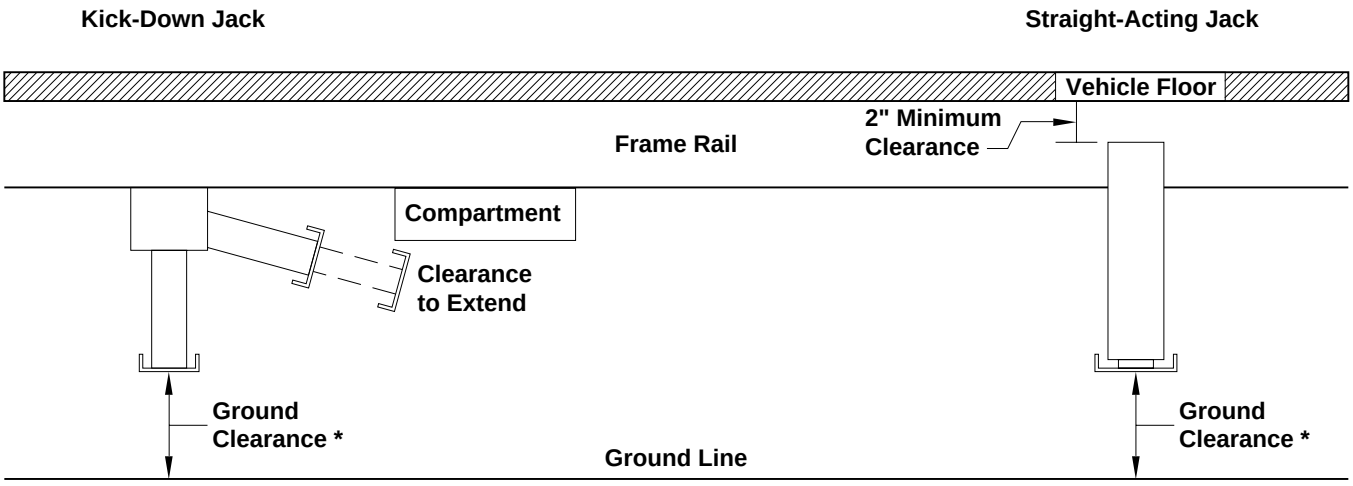
**IF THERE ARE ANY PROBLEMS WITH ANY OF THE ABOVE ITEMS, CONTACT HWH CORPORATION BEFORE STARTING THE INSTALLATION.**

## 2.) MOUNTING THE JACKS

This section contains general mounting location and arrangement information along with information specific to kick-down style or straight-acting style jacks. ***Read this section thoroughly. Mounting the jacks properly is essential to the correct operation of the leveling system.***

**General Information:** Refer to the **"CLEARANCE AND MOUNTING DIMENSION CHARTS"** in PART I of this manual for information needed to check available mounting locations for adequate clearance to mount and operate the jacks. Refer to the **Jack mounting Bracket Catalog (ML10049)** located in the HWH ON Line Installation School for specific information concerning bracket and mounting dimensions or jack / mounting bracket locations on frames. Information in this catalog is mainly vehicle generic in nature and is primarily used in aftermarket installations. O.E.M. installations will usually be more vehicle specific. O.E.M.s should contact HWH sales or engineering for specific information or drawings. **Use the combined information from the charts in PART I and the Bracket Catalog to determine a proper mounting location with adequate mounting and operational clearance before starting the installation.** Having the front jacks mounted only to find there is not an acceptable location for the rear jacks will be a frustrating experience.

**Check mounting bracket or jack mounting heights before continuing with mounting bracket / jack installation. Mounting the brackets or jacks at an improper height may interfere with correct operation of the leveling system.**




*** Refer to "CLEARANCE AND MOUNTING DIMENSION CHARTS" in SECTION I of this manual.**

**Figure 7**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

**Vehicles with spring suspensions.** The ground clearances listed in the Dimension Charts apply to vehicles with a full load of fuel, water and equipment. If the vehicle is empty, typically 1 inch should be added to the listed dimensions. Also, if the vehicle is new, the vehicle may settle down 3/4 of an inch or more in the first year or 10,000 miles.

**WARNING: DO NOT CRAWL UNDER A VEHICLE WITHOUT PROPERLY SUPPORTING THE FRAME OF THE VEHICLE IF THE VEHICLE IS SUPPORTED ON THE SUSPENSION AIR BAGS. THE VEHICLE WILL RAPIDLY DROP SEVERAL INCHES WHEN THE AIR IS EXHAUSTED FROM THE AIR BAGS. MAKE SURE THERE IS ADEQUATE CLEARANCE TO WORK UNDER THE VEHICLE WITH THE AIR BAGS DEFLATED.**

**Vehicles with air suspensions.** Typically, straight-acting jacks are used on vehicles with an air suspension. If the vehicle is at normal ride height when mounting heights are set, you must remember the chassis will lower between 2 and 3 inches when the suspension air bags are emptied. Ground clearances listed in the Dimension Charts are typically figured with the suspension air bags empty. If possible, measure the difference between the bottom of the frame and the ground with the vehicle at normal ride height and with the air bags empty. Add this dimension to the suggested ground clearance for the jacks listed in the dimension charts. Example: A 13 inch stroke jack is typically mounted with 7 to 9 inches of ground clearance. A vehicle with an air suspension drops 3 inches from normal ride height when the suspension air bags are emptied. The typical ground clearance for this installation should be 10 to 12 inches with the vehicle at normal ride height.

The following are some general rules to follow for a typical installation of leveling jacks on a vehicle:

1.) The front and rear jacks should be mounted behind the front and rear axles as close to the axles as possible. Jacks are not typically mounted in front of either the front or rear axles.
2.) The rear jacks are not typically mounted behind the end of the main frame rails on frame rail extensions.
3.) If the vehicle is equipped with a tag axle, the rear jacks are typically mounted between the drive axle and the tag axle.
4.) Front or rear jacks may be staggered several inches to accommodate vehicle equipment and compartments. If a cross tie is required, staggering the jacks more than an inch or two may not be possible.
5.) Most mounting brackets and straight-acting jack pivot brackets are designed with specific mounting hole arrangements. Some brackets are designed with a flange or finger that bolts to the bottom flange of the frame rail. When a mounting bracket or pivot bracket has a specific mounting hole arrangement, use of all bolt holes, including the flange holes is important. When mounting brackets or pivot brackets have multiple hole arrangements, the widest possible set of holes should be used. Always bolt brackets as close to the top and bottom of the frame rail as the brackets allow.
6.) Jacks and/or mounting brackets must be mounted so they do not interfere with suspension components, springs, air bags, linkages, etc. when retracted or extended.
7.) Front jacks and/or mounting brackets must be mounted so they do not interfere with the front tires when the tires are turned from stop to stop. Remember as a vehicle moves up and down, the geometry of the suspension can change. Clearance with the vehicle at rest may change as the vehicle moves up or down.
8.) Jacks should not be exposed to high temperatures such as exhaust components. Heat shields must be installed when necessary. If heat shields are supplied with jacks or brackets, both sides should be installed. Aftermarket exhaust systems may be installed at a later date.
9.) Normally, modification of the vehicle exhaust is not needed but if modification is needed, this should be done before the installation of the leveling jacks.

**Welding and drilling frame rails.** Typically, HWH mounting brackets and jacks are designed with holes to allow a bolt on installation. Welding to HWH supplied mounting brackets or a straight-acting jack pivot bracket is allowable but all acceptable welding practices must be followed. ***Before any welding is done on the frame rail, the chassis manufacturer must be contacted for authorization and procedures.*** Refer to WELDING in PART II JACK INSTALLATION for general welding information. This section contains basic welding information including procedures to follow for several different frame manufactures. ***This information may not be complete and may change from time to time so it is important to contact the frame manufacturer for current, specific welding information and procedures.*** When drilling holes, ***do not*** drill in the radius of the frame rail, ***do not*** drill closer than one bolt diameter to the edge of the frame rail flange and ***do not*** drill next to an existing hole. Again, one bolt diameter distance should be maintained. ***As with welding, contact the frame manufacturer for specific drilling information and procedures.*** **WHEN DRILLING OR WELDING, ALWAYS CHECK BEHIND THE OBJECT YOU ARE WELDING OR DRILLING ON FOR OBSTRUCTIONS OR EQUIPMENT SUCH AS WIRING, HOSES, BATTERIES OR HOLDING / FUEL TANKS. THESE OBJECTS MUST BE PROTECTED FROM WELDING HEAT OR DRILLING.**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

## WELDING

Typically, mounting brackets are not welded to the frame rails. However, if any welding is done such as modifying a jack bracket already mounted, the following precautions should be observed:

Connect welding ground to part being welded. NEVER weld to suspension parts such as spring shackles. NEVER weld across the bottom flange of the frame rail. Brackets should be located near a cross member. For additional information on the vehicle, chassis, brackets, and mounting location, contact the vehicle's builder, the chassis or suspension supplier, or HWH Corporation.

**WARNING: THERE MAY BE FUEL LINES OR WIRE INSIDE THE FRAME RAIL. THEY SHOULD BE WELL PROTECTED FROM THE HEAT CAUSED BY WELDING. DAMAGE OR PERSONAL INJURY COULD OCCUR.**

The following procedures are for specific chassis manufacturers.

**1. G.M.**

Disconnect both battery cables. ALWAYS DISCONNECT THE GROUND CABLE FIRST.

Disconnect computer module wiring.

Attach the welding ground to the part to be welded.

Do not use suspension components as ground points.

Keep welding cables away from electrical systems.

**2. FORD**

Disconnect both battery cables. ALWAYS DISCONNECT THE GROUND CABLE FIRST.

Disconnect computer module wiring.

Attach the welding ground to the part to be welded.

Do not use suspension components as ground points.

Keep welding cables away from electrical systems.

**3. OSH KOSH**

Disconnect both battery cables. ALWAYS DISCONNECT THE GROUND CABLE FIRST.

Attach the welding ground to the part to be welded.

Do not use suspension components as ground points.

Keep welding cables away from electrical systems.

**4. GILLIG**

Disconnect both battery cables. ALWAYS DISCONNECT THE GROUND CABLE FIRST.

Attach the welding ground to the part to be welded.

Do not use suspension components as ground points.

Keep welding cables away from electrical systems.

**5. SPARTAN**

Disconnect both battery cables. ALWAYS DISCONNECT THE GROUND CABLE FIRST.

Attach the welding ground to the part to be welded.

Do not use suspension components as ground points.

Keep welding cables away from electrical systems.

**NOTE: Check with the chassis manufacturer for the most recent information on welding precautions.**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

**Mounting kick-down style jacks:** Refer to drawings in the JACK MOUNTING BRACKET CATALOG for frame placement and mounting dimensions of the different brackets. Pre-punched or drilled and tapped mounting plates are available when on-site fabricating of a mounting system is required. Minor modification to brackets, such as making a small notch, is acceptable but HWH Corporation should be contacted if major modification or moving the bracket to a different mounting location is needed. Punch plates and kick-down brackets listed in the catalog are designed for use with 6000# and 9000# jacks. If 16,000# kick-down jacks are to be used and an existing mounting bracket on the frame is not available, a mounting bracket will have to be fabricated. Drilled and tapped mounting plates are available from HWH Corporation.

Refer to figures 1 thru 4 in section I, COMPONENT SELECTION, for typical to unacceptable mounting locations for the jacks. Kick-down jacks must be mounted so they swing upward to the rear or the vehicle when retracting to the horizontal position. **NEVER MOUNT KICK-DOWN JACKS SO THEY SWING TO THE FRONT OF THE VEHICLE (Figure 4).** Swinging jacks to the side of the vehicle is not suggested. (Figure 3)

Ample clearance behind the jacks must be maintained in case a jack extends before swinging to the vertical position. A horizontal adjustment is supplied with all kick-down style jacks. Jacks can be adjusted downward slightly to avoid contact with compartments or any vehicle or chassis equipment such as tanks and suspension components in case the jack extends before swinging vertical. These adjustments are discussed later in the manual.

Maintaining the correct ground clearance as listed in the "Clearance and Mounting Dimension Chart" for a kick-down jack is important. This allows for parking on uneven ground and also allows the use of a pad or block under the jack when parked on soft ground or asphalt. You must also allow for the vehicle to sag when loaded or as the vehicle ages. **It is important to follow the guidelines in the Clearance and Mounting Dimensions Chart for Kick-down Jacks.** If the jacks have to much clearance, 1-1/2 and 3 inch spacer kits are available. Each kit will do two jacks.

Typical installation of kick-down mounting brackets does not require welding to the vehicle frame rail. If any welding on the vehicle frame rail is to be done, the vehicle or chassis manufacturer should be contacted for authorization and procedures before proceeding. Welding to jack mounting brackets is allowable but all acceptable welding and safety procedures should be followed. Refer to "WELDING" in PART II of JACK INSTALLATION. ***IN NO CASE SHOULD A KICK-DOWN JACK PIVOT BRACKET BE WELDED DIRECTLY TO A FRAME RAIL OR A MOUNTING BRACKET.***

6,000# and 9,000# kick-down jacks and mounting brackets have slotted mounting holes so the jacks can be rotated slightly. This allows the jack to be mounted so it swings up and down in line with the vehicle. 16,000# jack mounting holes are not slotted. The brackets need to be installed as square in line with the vehicle frame as possible.

Some means of preventing the frame rail from twisting must be provided. Typically, the jack mounting brackets are mounted near a suspension bracket or a frame rail cross tie.

Mounting brackets and jacks should be bolted using hardware supplied by HWH Corporation. Make sure all bolts are properly tightened. A minimum of grade 5 bolt should be maintained if substituting for hardware supplied by HWH Corporation. Any flat and/or lock washers must be used when supplied in hardware kits. **Before the installation is complete, all mounting bolts for the mounting brackets and jacks should be rechecked for tightness.**

**WARNING: JACKS WILL SWING UP ABRUPTLY FROM THE VERTICAL POSITION WHEN RELEASED. BODILY INJURY CAN OCCUR WHEN CONTACT IS MADE WITH A SWING JACK.**

The kick-down jack will have to pivot to the vertical position to access all mounting bolts. Loosely fasten the two rearward pivot bracket mounting bolts first. Pull the jack to the vertical position and secure the jack so it cannot swing to the horizontal position. A small strap or chain works the best. **DO NOT jam a wrench or bar between the jack cylinder and pivot bracket. If the bar slips, the jack will abruptly swing up.** When the jack is completely fastened and the mounting bolts properly tightened, release the retaining strap or chain and allow the jack to pivot to the horizontal position.

**Mounting straight-acting style jacks:** The main concerns when mounting straight-acting jacks are the ground clearance, clearance above the jack to the vehicle floor and making sure the jack is mounted straight up and down with the vehicle so it does not push forward or backwards as it lifts the vehicle. If a jack cylinder incorporates a straight fitting for the hose connection, more clearance will be needed to attach the hose. Refer to the Clearance and Mounting Dimensions Chart Straight-acting Jacks, for typical ground clearance when the jacks are retracted. If the vehicle is equipped with an air suspension, the vehicle will lower between 2 and 3 inches when the air is dumped from the air bags. Remember to allow for this when determining mounting heights. Typically, we like the jack to have between 5 and 6 inches of lift. This should be taken into account when determining mounting heights.

Example: A 13 inch stroke jack should be mounted with 7 to 8 inches of ground clearance. Also remember there has to be clearance above the jacks to access hose and electrical connections. When determining the mounting height it is also important to maintain an adequate bolting pattern for mounting the jacks. A minimum of four bolts should be used to fasten each jack to the frame rail: two upper bolts and two lower bolts.

**Bolt Mounting Hole Patterns**

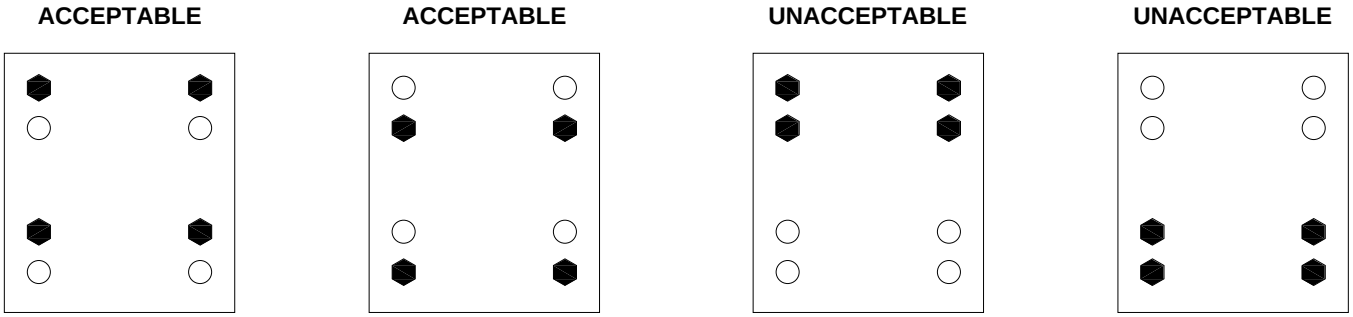



**Figure 8**

Mounting holes are normally provided on the jack pivot bracket or if a weld on style pivot bracket is used, the mounting plate for that style jack has pre-drilled mounting holes. Some frames may have pre-drilled holes that can be used. Typically, we like a minimum of 3 inches between the top and bottom mounting holes for 4,000# and 6,000# jacks with a minimum of 4 ½ inches between the top and bottom mounting holes for 9,000# and 12,000# jacks. HWH Corporation should be contacted for applications requiring 16,000# or 24,000# capacity jacks.

Due to variations in vehicle weight, jack capacities, frame width and construction, HWH cannot address all mounting possibilities and variations. It is the responsibility of the installer to recognize possible mounting issues such as mounting hole patterns or mounting positions on the frame rail. Anytime an issue is suspected, please contact HWH Corporation for assistance.

If using a jack with a weld-on style pivot bracket, a mounting plate that bolts to the vehicle frame rail should be used. First, determine the proper mounting height of the jack and fasten the mounting plate to the frame rail in the appropriate position. The jack can then be welded to the mounting plate. It may be best to tack the jack in place and then remove it from the fame rail to complete the welding of the pivot bracket to the plate in a flat position instead of a vertical position. **WHEN WELDING TO A PLATE THAT IS FASTENED TO THE FRAME RAIL, PROTECT ANY TUBES, WIRES, HOSES, ETC. ON EITHER SIDE OF THE FRAME RAIL FROM WELDING HEAT AND SPLATTER.**

The jacks or jack mounting plates should be bolted using hardware supplied by HWH Corporation. Make sure all bolts are properly tightened. A minimum of grade 5 bolt should be maintained if substituting for hardware supplied by HWH Corporation. Any flat and/or lock washers must be used when supplied in hardware kits. **Before the installation is complete, all mounting bolts for the jacks should be rechecked for tightness.**

When installing the front and rear jacks, some means of preventing the frame rail from twisting must be provided. Some jack assemblies have a cross tie assembly built into the pivot bracket arrangement. HWH Corporation offers an assortment of cross tie assemblies to tie the lower section of the jack pivot brackets together. If necessary, a cross tie assembly or some type of frame rail support may need to be fabricated on site. It is allowable to weld gussets and other components of a cross tie assembly. The cross tie assembly should not be welded to the jack pivot bracket in case the cross tie has to be removed to access other vehicle equipment.

**WARNING: DO NOT CRAWL UNDER A VEHICLE WITHOUT PROPERLY SUPPORTING THE FRAME OF THE VEHICLE IF THE VEHICLE IS SUPPORTED ON THE SUSPENSION AIR BAGS. THE VEHICLE WILL RAPIDLY DROP SEVERAL INCHES WHEN THE AIR IS EXHAUSTED FROM THE AIR BAGS. MAKE SURE THERE IS ADEQUATE CLEARANCE TO WORK UNDER THE VEHICLE WITH THE AIR BAGS DEFLATED.**

### 3.) AIR SUSPENSION - AIR DUMP INSTALLATION

**Before deflating the air bags, the vehicle's frame must be securely blocked so it cannot drop when the air is released from the air bags. Suspension components can also move when the air is released. Make sure there is ample room to work under the vehicle without interference from any moving suspension or vehicle component.**

The air bags can be deflated by disconnecting the air line that goes from the height control valve to the air bag. The best access to accomplish this is probably at the height control valve. The air dump solenoid valve tees in between the height control valve and the air bag. The kit will contain air dump solenoid valves as needed, a tee fitting for each air dump valve and a length of 3/8 inch air line. The tee will be 3/8' by 3/8" by 3/8". If the air line between the height control valve and the air bag is a different size than 3/8 inch, you will have to supply the correct tee fitting. **ALL AIR LINE FITTINGS USED MUST BE DOT APPROVED.** Typically, the dump valve is located fairly close to the height control valve. The valve should be mounted solidly to some type of frame member if possible. Ample air line is supplied to move the dump valve where it can be mounted properly. The valve has 2 mounting screws on the bottom of the valve that can be used to attach the valve to a mounting bracket. It is best if the valve is mounted so the exhaust port is protected from road splash. This will help keep the exhaust port free from dirt which could interfere with the operation of the valve. **IT IS IMPORTANT TO KEEP THE DUMP VALVE AND AIR LINES AWAY FROM ANY HEAT SOURCES SUCH AS THE ENGINE EXHAUST.**

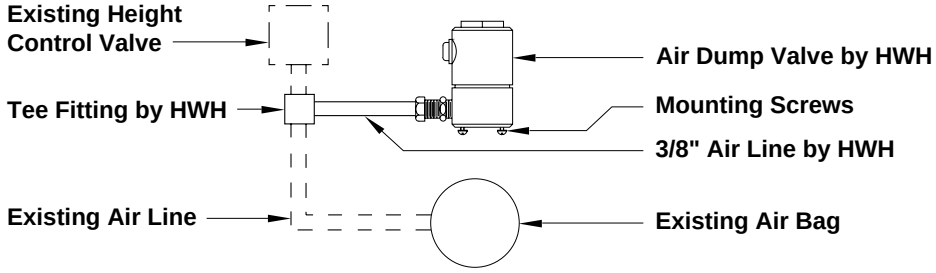



**Figure 9**

## 4.) POWER UNIT / CONTROL BOX ASSEMBLY INSTALLATION

Before installing the power unit assembly, you should check the length of the touch panel harness and lay out the warning switch / pressure switch harness. The power unit assembly should be mounted in a position that allows the harnesses to reach their designated components. **HARNESS SHOULD NOT BE LENGTHENED IN THE FIELD.** The warning / pressure switch harness has wires labeled for specific jacks. The plugs should not be switched front to rear or side to side. If this happens, the system will not function properly. Also, the control box level sensing unit should be programmed before installing the power unit assembly. See "Programming the level sensing unit" located in this section, on this page.

The power unit assembly should be mounted away from heat sources and protected from road splash. The valves must be accessible without having to crawl under the vehicle. This allows the valve release nuts to be used to lower the vehicle safely in the case of an electrical failure. Also consider accessibility for hose and harness routings. Mounting the assembly so the clear cover of the control box will be visible is desirable.

The power unit assemblies designed for class C applications can have the control box with its mounting bracket removed from the main assembly and mounted in a remote location. The amount the control box can be moved is limited to the length of the power unit harness. The touch panel and warning/pressure switch harness lengths should be considered when moving the control box. When remote mounting the control box, pay attention to heat sources, road spray and accessibility issues. The control box must be mounted to a solid surface with the "This Side Up" sticker pointing up.

**Programming the Level sensing unit:** The level sensing unit is located in the control box. The sensing unit must be programmed so the control box knows where the front of the vehicle is and what type of suspension is used, air or spring. **It would be best to program the sensing unit before installing the power unit assembly or the control box if it is to be mounted separate from the power unit.** The power unit assembly or control box is to be mounted in one of four directions. The clear cover of the control box should point to the front, rear, left (driver) side or right (passenger) side of the vehicle. HWH refers to the front of the vehicle as "North", no matter which way the vehicle is pointed. The rear is "South", the left side is "West" and the right side is "East". The sensing unit board has 4 programming jumpers; JP1-JP2-JP3-JP4. Jumpers 1 and 2 are for the direction of the control box; jumpers 3 and 4 are for the suspension type. Each set of pins has a small jumper attached to one of the pins. Use the jumpers to connect the pin sets as necessary.

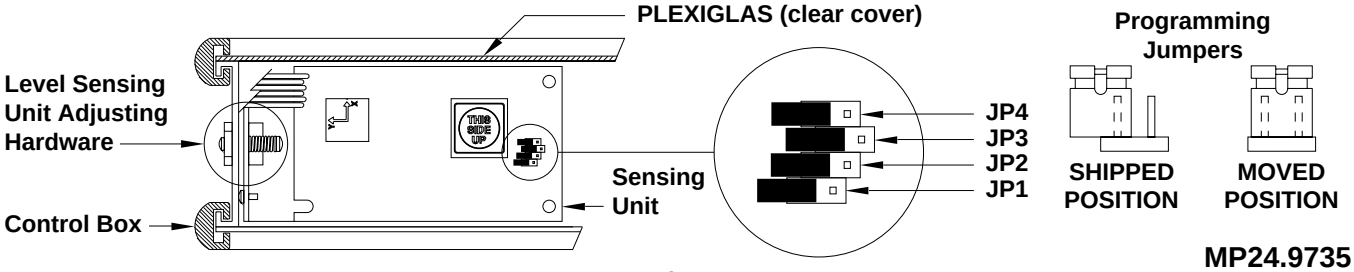



**Figure 10**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

The clear control box cover must be removed to program the sensing unit. Program the sensing unit as follows:
**Direction:**
Glass cover pointed to the "North" - move JP2 only.
Glass cover pointed to the "South" - move JP1 and JP2.
Glass cover pointed to the "East" - move neither jumper.
Glass cover pointed to the "West" - move JP1 only.
**Suspension Type:**
Spring suspension - Do Not move JP3 or JP4.
Air suspension - Move JP3 only.

For a detailed explanation and diagrams for jumper placement see "Jumper Placement For Electronic Sensing Units", MP44.1600 AND MP44.1601 located in SECTION IV of this manual.

**When replacing the clear glass after programming the sensing unit, it is important that the rubber glass retaining gasket is properly seated completely around the glass cover. This will help keep moisture out of the control box.**

The power unit/control assembly (with or without the control box) must be mounted solidly and supported at both ends of the mounting pan or bracket. It is also advisable to attach a brace from the top of the control box bracket to a solid frame member or support. This brace is not necessary if the box is mounted remote from the power unit. The level sensing unit is mounted in the control box and excess shaking or vibrations can interfere with the performance of the level sensing unit. Mounting the power unit in a compartment is acceptable but the floor of the compartment must be solid with adequate supports under the floor. Floor support should be added if the support supplied by the compartment floor is questionable. The class A style power unit can be mounted with the pump mounting bolts or bolted through the pump tray. Either way, both ends of the assembly must be solidly supported. **If the pump mounting bolts are not used to secure the power unit assembly, make sure they are properly tightened before completing the installation.** The class C style power unit assembly mounting bracket has mounting holes at the center of the assembly and at the end of the assembly. Both areas of the mounting bracket should be solidly supported and bolted.

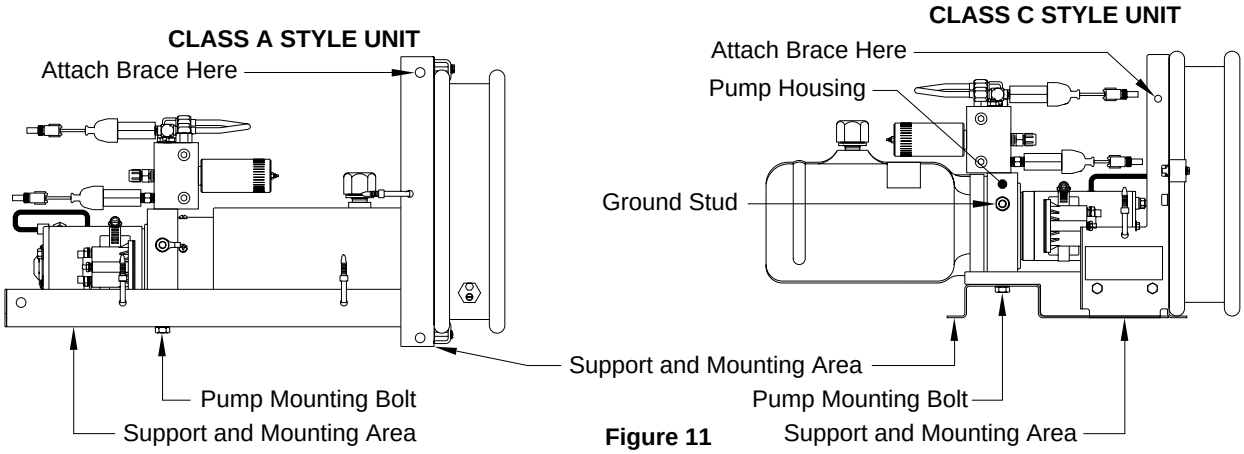



**Figure 11**

**Proper grounding of the power unit assembly is critical.** All grounding of the system including the pump motor, solenoid valves and control box is accomplished through the pump housing. The pump housing is the square block between the pump motor and fluid reservoir. The mounting bolts for the power unit go into the pump housing. There is also a ground stud that screws into the pump housing. If the class A style power unit assembly is secured to a solid frame member with the pump mounting bolts, that will probably supply an adequate ground for the system. If the power unit is secured through the pump tray or if a class C style power unit assembly is being installed, a No. 2 ground cable or cable that is an equivalent size to the main battery cable for the master relay, should be used to ground the power unit assembly to a main frame rail. The ground cable can be attached to the ground stud screwed into the pump housing. **A ground cable should always be applied to the power unit assembly when the assembly is mounted in a compartment, even if the compartment is of a metal construction.** Adding the ground cable to assure a good system ground is a good idea in any installation.

**IMPORTANT: No more than four ring terminals are allowed on one grounding stud or bolt. If necessary, the pump mounting bolt can be used to attach the ground cable to the assembly. Always protect these connections from corrosion with some type of sealant such as Red Air Dry Enamel (RANVAR), number B6-665, made by the P.D. George Company. Refer to MI95.54 Information Bulletin which can be obtained in the Information Bulletin section or from the HWH web site.**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

## 5.) TOUCH PANEL INSTALLATION

The touch panel can be mounted anywhere inside the vehicle but in the drivers area may be the most desirable when possible. The mounting location of the touch panel should be discussed with the vehicle owner. Remember to take into account the length of the touch panel cable when determining a mounting location for the touch panel. A spacer box is available to surface mount the touch panel on a flat surface. The touch panel may also be flush mounted on most flat surfaces. A template is available in the diagram section of this manual to mark the cutout for a flush mount application. Do not flush mount the panel on any surface that is not flat. Tightening the panel down to a curved surface will damage the panel. An angled bezel plate is available to mount the touch panel to a slightly curved surface.

It is suggested to not cut through the floor to mount the touch panel. If the panel is to be mounted on the floor, use the spacer box to house the touch panel. When mounting the touch panel on the floor, locate the panel in an area that will protect it from being stepped on. **Seal any holes to the outside of the vehicle to protect the touch panel from dirt and water.**

**Before drilling or cutting holes in any surface, check for obstructions such as wires or hoses behind the surface. Protect wires or other equipment from damage when cutting or drilling.** Several inches of clearance should be allowed behind the touch panel mounting surface. The back of the touch panel must not contact any metal object or surface.

Make sure the touch panel cable is securely plugged in before installing the touch panel. Do not over tighten the four touch panel screws. Over tightening the screws will damage the touch panel.

## 6.) HYDRAULIC HOSE ROUTING AND CONNECTIONS

**General Information:** Improper hose routing or tightening of the hose ends can cause improper system operation and harm the integrity of the hydraulic connections. Dirt and other contamination are huge contributors to system malfunction. **Keep hose ends plugged and hydraulic fittings capped until you are ready to attach the hose end to the component fitting.** If you are swaging your own hose, plug or seal the hose ends before routing the hose. Hoses supplied by HWH Corporation have a part number tag near each hose end. This can be used to check that a hose connects the correct jack and manifold fitting. If you swag your own hoses or have hoses of the same length (they will have the same part number), it is suggested to mark the hose to ease making proper connections at the manifold. Colored tape or wire ties make good permanent markers. Follow the hydraulic line connection diagram in this manual. Improper hose connections will cause improper system operation.

### The following rules are for proper hose routing:

**1.) Do not pull hoses taut.** Leave a small amount of slack when routing a hose. BUT do not leave so much slack a hose can dangle and possibly be snagged while the vehicle is moving. Allow for jack movement when necessary. Straight-acting jacks with pivot brackets can move several inches when they pivot. Pulling a hose taut with the jack at the normal retracted position can cause hose or fitting damage when the jack pivots. Kick-down jacks must be free to pivot from the horizontal position to 45 degrees past the vertical position and back. Make sure hoses are routed properly and not so tight as to interfere with the swinging motion or moving parts of the jack. For proper hose routing and connections for kick-down jacks, refer to the "Hose Routing for Kick-down Jacks" page in this section.

**2.) When possible, avoid sharp bends, loops or coiling hose.** If making a loop or coiling excess hose is necessary, make as big of loops or coils as possible. Fasten the loops or coils securely so they cannot dangle or rub. Swaging equipment is available to custom fit hoses but approved HWH procedures must be followed when swaging hose. **Crimping of hose ends is not allowed.** Contact HWH Corporation or refer to ML24976 under "Information Bulletins" on the HWH web site for hose swaging information.

**3.) Avoid twisting the hose.** Twisting a hose can put a strain on the fitting connection. Use a backup wrench when necessary to avoid twisting the hose when tightening the hose end.

**4.) Do not allow the hoses to rub.** Make sure hoses will not come in contact with moving parts such as suspension or engine components. Use an adequate number of hose clamps, wire ties, etc. to prevent hoses from moving or drooping. Avoid sharp edges when routing hoses. Dull the edge if possible and protect the hose with hose guard such as split loom.

**5.) Stay away from heat sources.** The general rule of thumb is to have **"no direct line of sight between a hose and exhaust or heat component."** Use properly installed heat shields when necessary. Areas with a constant ambient temperature of 180 degrees Fahrenheit, such as the engine compartment or close to the radiator, should be avoided. Be cautious of enclosed compartments that may be too warm due to the proximity of an exhaust, turbo charger or engine cooling component.

**6.) Never fasten the hydraulic hoses to any fuel, brake or propane line.**

**Tightening of hose ends.** When tightening a new hose end, make the hose end snug (finger tight) on the fitting, then tighten the hose end 1/3 turn (2 flats). If tightening an existing hose end that has been tightened once, make the hose end snug (finger tight) on the fitting, then tighten the hose end 1/4 turn (1 to 1-1/2 flats).

# HOSE ROUTING FOR KICK-DOWN JACKS
# AND
# JACK PRESSURE SWITCH INSTALLATION

**KICK DOWN JACKS:**

**6000# KICK DOWN JACK-** A short hose is attached to the jack at the factory. The hose is clamped to the pivot bracket. It can be moved to the opposite side of the jack if necessary to avoid heat sources or other obstacles.

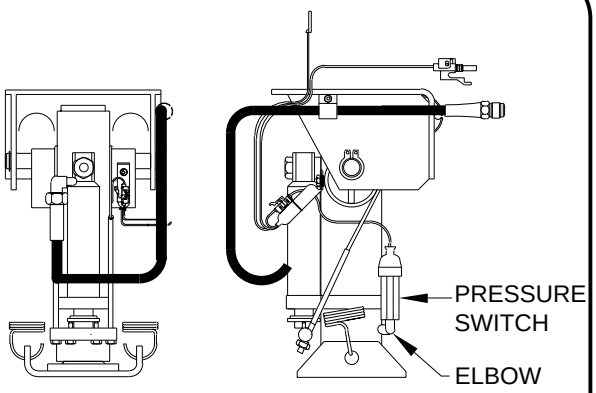



**FIGURE 12**

**9000# KICK DOWN JACK** - When connecting the hose to the jack, the hose should go in the upper left-hand corner, over the pivot area and down the front of the jack. After connecting the hose to the fitting, the hose should be clamped with a 1/4" bolt to the left side of the pivot bracket. Be sure the hose is snug against the jack in the retracted (horizontal) position.

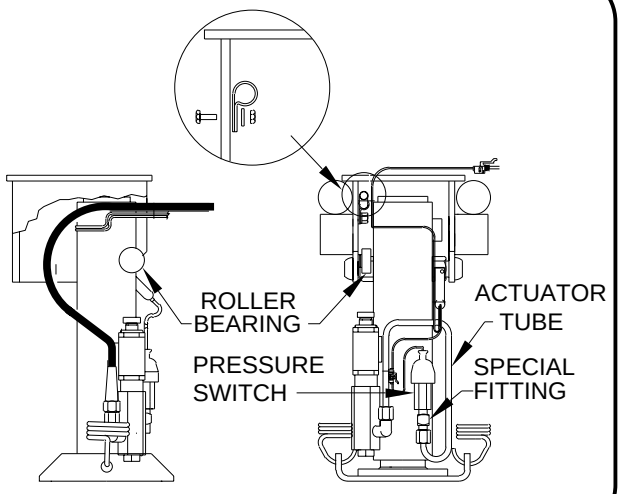



**FIGURE 13**

**16000# KICK DOWN JACK-** Route the hose around the left pivot, then across the back side of the cylinder and connect to the actuator fitting. Attach the hose to the pivot bracket using a hose clamp. There should be no slack in the hose.

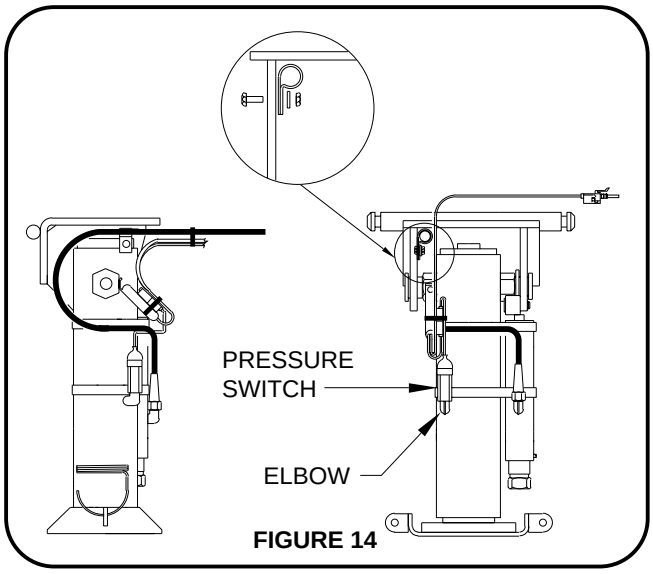



**FIGURE 14**

**STRAIGHT ACTING JACKS :**

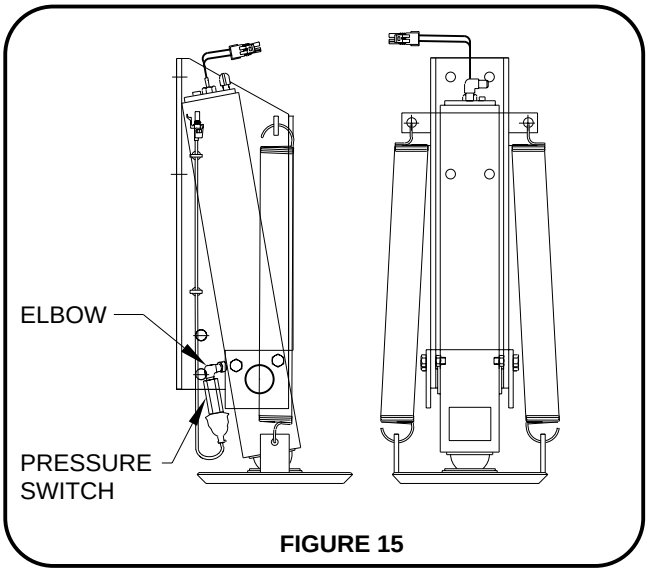



**FIGURE 15**

**PRESSURE SWITCHES :** All automatic, computerized systems require a pressure switch on each jack. In most cases the pressure switch will need to be installed on the jack. It may be easier to install the switch before mounting the jack. Refer to FIGURES 12,13,14 & 15 for proper pressure switch locations.

On the 6000# and 16000# kick down jacks and straight acting jacks there is a plug that needs to be removed. Then install the elbow and pressure switch as shown. Be sure to use Teflon tape on all pipe threads.

On 9000# kick down jacks, remove the actuator line. Then remove the existing elbow. Install the special fitting and pressure switch as shown. Then reinstall the actuator tube. Be sure to use Teflon tape on all pipe threads.

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

## 7.) HARNESS OR WIRE ROUTING AND CONNECTIONS

**General Information:** Refer to the wiring diagrams in this manual for connection information. Wiring harnesses supplied with aftermarket kits are usually adequate for most installations. O.E.M. installers should work directly with HWH Corporation to obtain specific harness lengths that are needed. All installation connections are a plug in type connection except the main battery cable to the master relay and the connection to ignition power for the control box, the master warning light and the warning buzzer.

We do not suggest altering harness lengths. **The touch panel harness must never be altered for any reason. If a different length touch panel harness is needed, contact HWH Corporation.** If you choose to alter the length of other HWH harnesses, all connections should be soldered and then protected with a glue filled shrink tube. It is important to maintain correct wire size with insulation rated for 125 deg. Celsius (257 deg. F). If adding length to a harness, a larger gauge wire may be needed to maintain proper current carrying capabilities. **Do not eliminate harness and equipment plugs for solenoid valves, warning switches, pressure switches or other HWH equipment.** If altering a harness length, don't cut all the wires at once. Working on one wire at a time will eliminate the possibility of reconnecting wires incorrectly. All connectors are labeled with numbers or letters for wire position. Wires are labeled with numbers to indicate wire function and position. Refer to the appropriate wiring diagrams in this manual for correct wire positions in connectors when altering a harness. **Maintaining correct wire positions in all plugs or connectors is essential to the proper operation of the leveling system.**

### The following rules are for proper harness or wire routing:

**1.) Do not pull harness or wires taut.** Leave a small amount of slack when routing wiring. BUT do not leave so much slack wiring can dangle and possibly be snagged while the vehicle is moving. Allow for jack movement when necessary. Straight-acting jacks with pivot brackets can move several inches when they pivot. Pulling wires taut with the jack at the normal retracted position can cause wire or connection damage when the jack pivots. Kick-down jacks must be free to pivot from the horizontal position to 45 degrees past the vertical position and back. Make sure wires are routed properly and not so tight as to interfere with the swinging motion or moving parts of the jack.
**2.) Do not allow the harness or wires to rub.** Make sure wiring will not come in contact with moving parts such as suspension or engine components. Use an adequate number of wire ties to prevent harnesses or wires from moving or drooping. Avoid sharp edges when routing wiring. Dull the edge if possible and protect wiring with a guard such as split loom.
**3.) Stay away from heat sources.** The general rule of thumb is to have **"no direct line of sight between wiring and exhaust or heat component."** Use properly installed heat shields when necessary.
**4.) Never fasten harnesses or wiring to any fuel, brake or propane lines.**

**Fuse, battery cable and wire information.**

**IT IS THE INSTALLERS RESPONSIBILITY TO DETERMINE FUSING REQUIREMENTS WHEN FIELD CONNECTIONS OF WIRES OR CABLES ARE NEEDED. FOR SPECIFIC FUSING OR WIRE STANDARDS AND GUIDELINES REFER TO THE MOST RECENT EDITION OF "ANSI/RVIA - STANDARD FOR LOW VOLTAGE SYSTEMS IN CONVERSION AND RECREATIONAL VEHICLES". CONTACT RVIA (RECREATION VEHICLE INDUSTRY ASSOCIATION), FOR ASSISTANCE OR THE MOST RECENT EDITION OF THIS PUBLICATION.**

Most of the power outputs for the leveling system equipment, including the touch panel, are fused at the control box. The 6120 wire in the touch panel harness is Accessory/Ignition power for the control box. This is a field connection for the installer. The 6120 wire should go to the Accessory side of the ignition switch. HWH does not supply fusing for this wire. If a fuse is installed for this wire, a 15 amp fuse (max.) should be used. When a master warning light and buzzer are used, a fused pigtail is supplied by HWH. This pigtail has a diode and should not be altered. **If replacing a fuse, never exceed the fuse size stated on the circuit board or fuse holder.**

HWH has several different size pump motors, a 3 inch dia., a 3.7 inch dia. and a 4.5 inch dia. motor. When the power unit has a 3 or 3.7 inch motor, a minimum number 2 gauge battery cable should be used to connect the power supply to the pump motor relays. A 150 amp fuse or circuit breaker should be used if circuit protection is required. Most aftermarket systems utilize the 3 or 3.7 inch motor, and a 5 foot number 2 gauge battery cable is usually supplied with these power units. A longer cable may be used, but depending on the length of cable needed, the gauge size of the cable may need to be increased to limit voltage drop. If a 4.5 inch dia. motor is used, the battery cable size should be increased to a minimum number 1 gauge cable with a 200 amp fuse or circuit breaker used when circuit protection is required.

**It is the installer's responsibility to determine the necessary wire gauge size needed to maintain a minimum voltage drop when the length of the cable is increased. When it is necessary to increase the wire gauge size and circuit protection is required, the fuse or circuit breaker size should not be increased.**

## 8.) PARK BRAKE/JACK INHIBIT CIRCUIT

**IMPORTANT: The park brake circuit inhibits the system from extending the jacks while the vehicle is moving. It is important that the park brake circuit is installed as explained. It is also important that the correct function of the park brake circuit is checked before the installation is completed.**

The control box is looking for a ground signal on the #9000 park brake wire. Although most applications will have a ground signal from the park brake switch for the dash park brake light, it is not impossible to have a + voltage signal. We will explain an installation method that will work with a + voltage park brake signal.

**Normal installation for a ground park brake signal.** The park brake wire is a black wire labeled with the number 9000. This wire is in the touch panel harness. The end of the wire has two butt connectors and shrink tube. There is also a diode assembly at the end of the wire. **Do not eliminate the diode assembly.** The butt connector assembly splices into the wire between the park brake switch and the dash park brake light. See the figure below. If necessary, contact the chassis or vehicle manufacturer for information about the correct wire to spice the HWH park brake wire into. After cutting the park brake wire, use the butt connectors to connect the diode assembly to the existing park brake wire. Cut the wire ties and use the shrink tube to seal the butt connector connections.

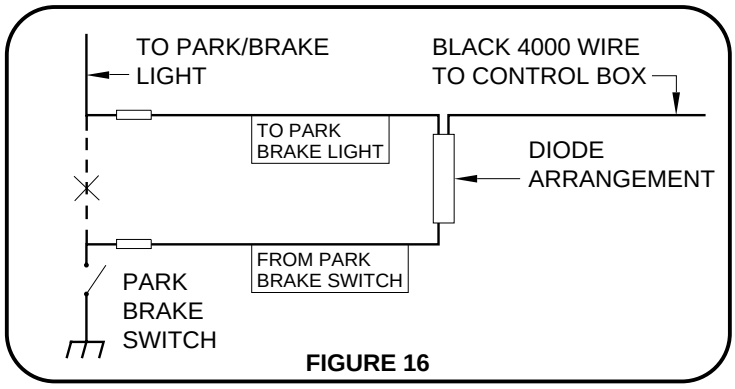



**FIGURE 16**

**Installation for a + voltage park brake signal.** If the vehicle park brake signal is a + voltage, it is still important that the park brake wire is installed in such a way that it will inhibit the leveling system from being able to extend the jacks while the vehicle is moving. The diagram below shows how to use a Bosch relay to switch a ground for the HWH park brake wire using the "ON" or "RUN" side of the vehicle's ignition switch. For this installation, the diode assembly can be eliminated. Connect the HWH #9000 park brake wire to terminal 87a (normally closed contact). Install a ground wire on terminals 30 and 85. Install a wire from the "ON" side of the vehicle ignition switch to terminal 86 of the relay. When the ignition is on, there should be no ground on the HWH #9000 park brake wire. With the ignition off, there should be a ground on the #9000 wire. The HWH #6120 wire in the touch panel harness should be connected to the "ACC" side of the ignition switch. If this arrangement will not work for a particular vehicle, HWH should be contacted to help make sure the HWH park brake circuit is installed properly.

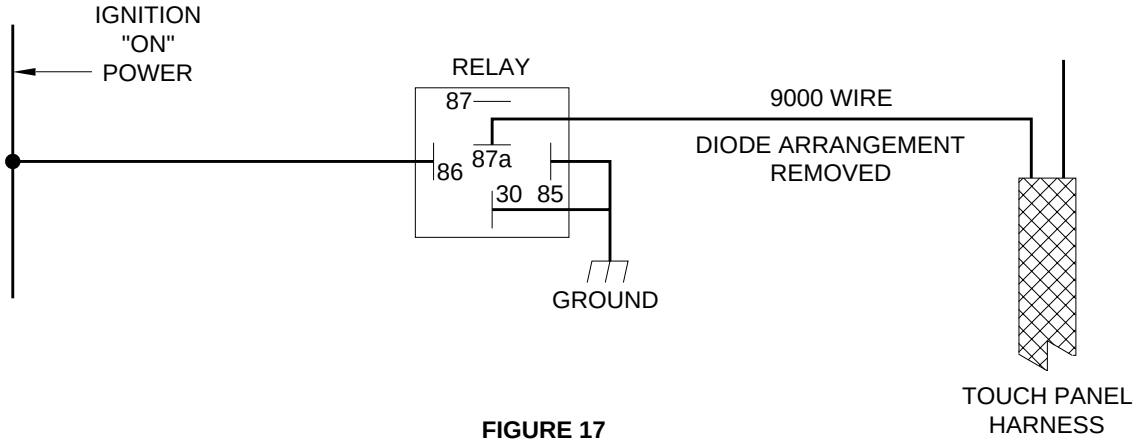



**FIGURE 17**

# SECTION II
# 625/625S SERIES LEVELING SYSTEMS
# COMPONENT INSTALLATION

## 9.) MASTER WARNING LIGHT/BUZZER INSTALLATION

**A MASTER JACKS DOWN WARNING LIGHT SHOULD BE USED WITH ALL SYSTEMS. A BUZZER MUST BE USED WITH SYSTEMS USING STRAIGHT-ACTING JACKS.** The master warning light and buzzer will warn the driver that one or more jacks are extended slightly (straight-acting jacks) or in the vertical position (kick-down jacks) with the ignition on. If only a master warning light is used, the master warning light will work with the ignition in the "ON" or "ACC" position. The master warning light should be mounted in the dash in a location highly visible to the driver. If a buzzer is required or used, the buzzer will be mounted behind the dash, close to the master warning light.

**If kick-down jacks are used,** the touch panel harness will have two wires for the master warning light. A #6121 wire that is + voltage supply and a #7699 wire that is switched ground control. Do not supply power to the HWH control box until the master warning light installation is complete. There will be +12 voltage on the #6121 wire anytime the ignition is in the "ON" or "ACC" position.

**Warning light installation (light only).** Drill a 1/2 inch hole in the dash for the master warning light. **Be careful to protect wires or equipment behind the dash where the hole is being drilled.** Apply the jacks down legend to the master warning light. Use the fast on connectors supplied to attach the #7699 control wire and the #6121 voltage supply wire to the warning light. Remove the protective film from the legend and push the warning light into the ½ inch hole.

**If straight-acting jacks are used,** a pigtail arrangement is supplied by HWH that enables the installer to supply power to the warning light and buzzer from the "ON" side of the ignition switch and supply power to the control box from the "ACC" side of the ignition switch. This way the jacks can be extended without the buzzer sounding unless the ignition is on. The pigtail has a fuse and a diode arrangement and should not be altered. (Any of the pigtail wires can be lengthened as long as the fuse/diode arrangement is not altered.)

**Warning light/buzzer installation.** Drill a 1/2 inch hole in the dash for the master warning light. **Be careful to protect wires or equipment behind the dash where the hole is being drilled.** Apply the jacks down legend to the master warning light. **Make sure the ignition switch remains off until the master warning light/buzzer installation is complete.** Connect the fused pigtail to the "ON" side of the ignition switch. If supplied separately, connect the 7699 pigtail to the #7699 wire from the touch panel harness. Attach the wires with fast on connectors to the warning light. Remove the protective film from the legend and push the warning light into the ½ inch hole. Attach the wires with a ring terminal connector to the buzzer. Note that the buzzer is marked with a + voltage and ground side. It is best to make a bracket for the buzzer or to wire tie the buzzer so it is not dangling from the wires.

**SEE THE MASTER LIGHT/BUZZER CONNECTION DIAGRAM IN SECTION IV OF THIS MANUAL FOR A DETAILED VIEW OF BOTH STYLES OF INSTALLATION.**

## 10.) FLUIDS

It is recommended to use HWH Specialty Hydraulic oil in HWH leveling systems. If not available, a good multipurpose or Dexron automatic transmission fluid can be used. **DO NOT USE** brake fluid or hydraulic jack oils. These fluids can damage seals. Fill the fluid reservoir tank to within 1 inch of the top of the tank. The fluid level will have to be topped off after running the system a few times.

## 11.) INSTALLATION CHECK LIST

1.) CHECK ALL MOUNTING BOLTS AND BRACKETS FOR TIGHTNESS.

2.) CHECK THAT ALL HOSES ARE SECURELY CLAMPED OR TIE WRAPPED.

3.) CHECK THAT ALL WIRES ARE SECURELY CLAMPED OR TIE WRAPPED.

4.) CHECK THE OIL LEVEL BEFORE OPERATING THE SYSTEM.

5.) CHECK THE HYDRAULIC CIRCUIT.
- a. Hoses are connected to corresponding valves and jacks.
- b. All fittings and hose ends are properly tightened.

6.) CHECK THE WIRING CIRCUIT.
- a. All connectors going to the right component.
- b. All cables and ground wires are securely fastened.
- c. All open connections protected from moisture and dirt.

# SECTION III
# 625/625S SERIES LEVELING SYSTEMS
# SYSTEM START-UP AND ADJUSTMENTS

**At any time the system will not function, refer to the 625 or 625s repair manual in the service manual section of the HWH website.**

## 1.) PARK BRAKE CHECK

The park brake circuit must function properly for the leveling system to function properly. The test is different between the 625 system and the 625S single step system. **CHOCK THE WHEELS DURING THIS TEST SO THE VEHICLE CAN NOT ROLL WHEN THE PARK BRAKE IS RELEASED.**

**625 system park brake test.** Turn the ignition switch to the "ACC" position. Make sure the park brake is set. Push the "I" / "HYD" button. The on light above the button should come on. The "NOT IN PARK / BRAKE" light should not be on. Push on the foot brake so the vehicle can't roll, then release the park brake. The "NOT IN PARK / BRAKE" light should come on. With straight-acting jacks, push any manual UP ARROW. With kick-down jacks, push the "I" / "HYD" button a second time. With either system, the pump should not run. If the pump runs with the "NOT IN PARK / BRAKE" light on, or if the "NOT IN PARK / BRAKE" light will not come on with the park brake released, refer to the 625 repair manual.

**625S system park brake test.** Turn the ignition switch to the "ACC" position. Make sure the park brake is set. Push any manual UP ARROW, the pump should run. Release the UP ARROW. Push on the foot brake and release the park brake. Again, push any UP ARROW. The "NOT IN PARK BRAKE" light should come on while pushing the UP ARROW and the pump should not run. If the pump runs or the "NOT IN PARK / BRAKE" light will not come on with the park brake released, refer to the 625S repair manual.

## 2.) HYDRAULIC START-UP

**Kick-down jacks.** Make sure the ignition is in the "ACC" position and the park brake is set. Push the "I" / "HYD" button one time. Make sure the ON light is lit. Push the "I"/ "HYD" button a second time. The pump should run. The jacks should try to swing vertical, starting with the left front jack, then the right front jack, then the right rear jack and finally the left rear jack. The pump should run no more than 15 to 20 seconds then shut off. The first time the system is run, the jacks may or may not swing vertical. This is due to the priming of the pump and filling the hydraulic lines. Push the "OFF"/ "EMERGENCY STOP" button then the "STORE" button. Make sure all jacks have retracted. Repeat the procedure until all four jacks have swung vertical. After 2 or 3 times at the most, all the jacks should be swinging vertical. The individual red warning lights on the touch panel should be on when the appropriate jack is in the vertical position. The master warning light should be on if any jack is in the vertical position. With the jacks fully retracted to the horizontal position, the touch panel warning lights and the master warning light should be out. Check the reservoir fluid level and fill as needed.

**If all of the jacks will not swing vertical,** check the hydraulic circuit and the touch panel warning lights. Make sure the warning lights are off when the jacks are in the horizontal position. With the touch panel on, pull each jack to the vertical position and make sure the appropriate touch panel warning light comes on. The warning lights must work correctly for the jacks to swing to the vertical position and for the system to function properly. Make sure the hoses are connected to the correct fittings.

Chock the tires so the vehicle cannot roll. Push the "I"/ "HYD" button twice to put the jacks in the vertical position. Push the front UP ARROW to extend the front jacks to the ground and lift the vehicle 1 or 2 inches. Push the rear UP ARROW to extend the rear jacks to the ground and lift the vehicle 1 or 2 inches. **Do not raise the rear of the vehicle high enough to lift the rear tires off the ground. The vehicle will roll forward or backwards off the jacks if the rear tires leave the ground.** Push the "OFF" / "Emergency Stop" button. Push the "STORE" button. When the jacks have fully retracted repeat the procedure at least once more. With the jacks retracted to the horizontal position, check the fluid level and fill as necessary. The system should now be ready to make adjustments and test the automatic function of the system.

**Straight-acting jacks; 625 leveling system.** Make sure the ignition is in the "ACC" position and the park brake is set. Push the "I" / "HYD" button one time. Make sure the ON light is lit. Push and release the front UP ARROW at 5 second intervals until both front jacks reach the ground and lift the vehicle 1 or 2 inches. When the jacks have extended approximately 1 inch, the front red warning lights on the touch panel should be on. The master warning light should be on. Push and hold the front DOWN ARROW until both front jacks have fully retracted. The touch panel warning lights should go out. The master warning light should be out. Check the reservoir fluid level and fill as necessary. Repeat this with the rear up arrow and check the fluid level and fill as necessary. Repeat the complete procedure at least once more. Now extend the front jacks then with the front jacks extended, extend the rear jacks. Push the "Store" button and check that all the jacks will fully retract. Check and fill the reservoir as necessary. The system should now be ready to make adjustments and test the automatic function of the system.

**Straight-acting jacks; 625S single step leveling system.** Make sure the ignition is in the "ACC" position and the park brake is set. Push and release the front UP ARROW at 5 second intervals until both front jacks reach the ground and lift the vehicle 1 or 2 inches. When the jacks have extended approximately 1 inch, the front red warning lights on the touch panel should be on. The master warning light should be on. Push and hold the front DOWN ARROW until both front jacks have fully retracted. The touch panel warning lights should go out. The master warning light should be out. Check the reservoir fluid level and fill as necessary. Repeat this with the rear up arrow and check the fluid level and fill as necessary. Repeat the complete procedure at least once more. Now extend the front jacks then with the front jacks extended, extend the rear jacks. Push the "Store" button and check that all the jacks will fully retract. Check and fill the reservoir as necessary. The system should now be ready to make adjustments and test the automatic function of the system.

## 3.) PLUMBING AND WARNING LIGHT/BUZZER CHECK

**With kick-down jacks,** when all of the jacks will swing to the vertical position and the four touch panel jack down warning lights are working, it can be assumed the plumbing and wiring is correct. Check that the master warning light works with any one jack in the vertical position. The ignition switch should be in the "ACC" position. If a warning buzzer is also used, with any one jack in the vertical position, the master warning light and buzzer should not work if the ignition is in the "ACC" position but should work if the ignition is in the "ON" position.

**With straight-acting jacks,** use each set of UP and DOWN ARROW buttons. Along with checking the touch panel warning lights, visually check the jacks When using each set of UP and DOWN ARROWS. Make sure that only the pair of jacks for the button that is being pushed is extending and retracting. It is important to use all four sets of buttons for this test, not just the front and rear buttons. With the ignition in the "ON" position and any one jack extended about 1 or 2 inches, the master warning light and buzzer should work.

## 4.) KICK-DOWN JACK ADJUSTMENTS

Each jack should be checked to be sure that it is vertical when it swings down. To do this, kick the jacks vertical then extend the jacks until it they are close to but not touching the ground. Each jack must also be adjusted so it can extend in the horizontal position without interfering with any suspension components, tanks, etc.

The following figures show the horizontal and vertical adjustment points for the 6000#, 9000#, 16000# and 24000# jacks.

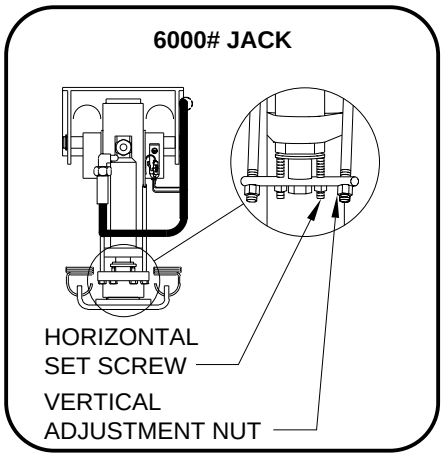



Figure 18

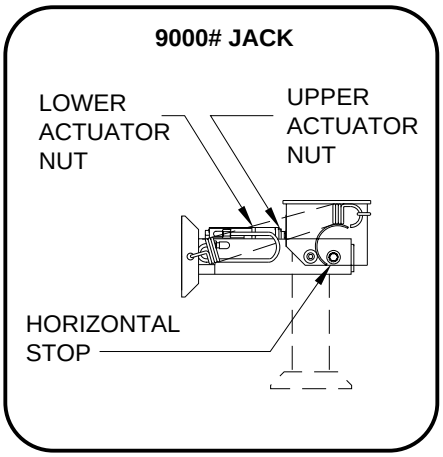



Figure 19

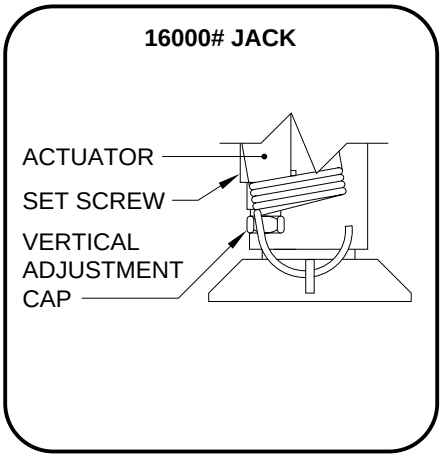



Figure 20

**1. 6000# JACKS:** Always make the vertical adjustment first. If the vertical adjustment is changed at any time, be sure to check the horizontal adjustment. The vertical adjustment is changed by adjusting the lock nuts on the actuator cable. If the jack stopped short of vertical, tighten the lock nuts. If the jack goes past vertical, back the lock nuts off. Be sure to adjust each nut of the actuator cable the same number of turns. Hold the actuator cable with a vice grip while turning the vertical adjustment nuts so the cable can not twist.

The horizontal stop is adjusted by turning the set screws located just inside the cable lock nuts. Loosen the jam nuts before turning the set screws. Tighten the set screws to move the jack down more. Loosen the set screws to move the jack up more. Make sure to turn each set screw an equal amount. The jack can be adjusted down to provide clearance for objects which may interfere with the operation of the jacks. The horizontal stop must be adjusted to provide clearance in case the jack extends in the horizontal position. The jack must be able to fully extend in the horizontal position without interfering with suspension components, tanks, etc.

**2. 9000# JACKS:** If the jack stopped short of being vertical it can be adjusted by loosening the lower actuator nut and tightening the upper actuator nut. If the jack goes past vertical, loosen the upper actuator nut and tighten the lower actuator nut.

The horizontal stop can be adjusted up or down in the slot to provide clearance for objects which may interfere with the operation of the jack. The stop must be adjusted so that the jack can be fully extended in the horizontal position without interfering with suspension components or tank, etc.

**3. 16000# AND 24000# JACKS:** If the jack stopped short of being vertical, loosen the set screw at the bottom of the actuator and turn the adjusting cap clockwise. If the jack goes beyond vertical, loosen the set screw and turn the adjusting cap counterclockwise. After each counterclockwise adjustment, the weight of the coach must be applied to the jack to make the adjustment effective. Do NOT adjust the cap more than one turn without cycling the jack.

The horizontal stop for the 16000# and 24000# jacks is a urethane bushing the jack hits when it swings to the horizontal position. If the jack needs to be adjusted down, add washers under the urethane stop. Use a longer bolt if necessary.

## 5.) LEVEL SENSING UNIT ADJUSTMENT AND CHECK

The level sensing unit adjustment instructions are on page MP44.1610 in SECTION IV of this manual. The four yellow lights on the touch panel are the level indicator lights. If a yellow light is on, that side or end is low. When all four yellow indicator lights are off, the vehicle is level within the tolerance of the level sensing unit. Follow all of the instructions, including the "tweaking" instructions, to properly adjust the level sensing unit. **Make sure to check the operation of the level sensing unit in several different out of level positions.**

**WHEN THE SYSTEM HAS KICK-DOWN JACKS, CHOCK THE FRONT WHEELS OF THE VEHICLE FOR THE FOLLOWING TEST. IF THE REAR WHEELS OF THE VEHICLE ARE LIFTED OFF THE GROUND THE VEHICLE CAN ROLL FORWARD OR BACKWARD OFF THE JACKS.**

After the level sensing unit is adjusted, make sure the yellow level indicator lights are functioning properly. Use the manual UP and DOWN ARROWS to raise one side or end of the vehicle at a time. Make sure the correct level indicator light comes on. Example: Use the front UP ARROW to lift the front of the vehicle until the rear yellow light comes on. If the yellow level lights are not indicating the correct low side or end, check the touch panel lights against the yellow LEDs on the level sensing unit board. If the lights on the sensing unit board do not match the touch panel level indicator lights, the sensing unit is not programmed properly. Refer to MP44.1600, "JUMPER PLACEMENT FOR THE ELECTRONIC SENSING UNIT" for information to correctly move jumpers to program the sensing unit.

**IMPORTANT: Discuss the tolerance of the sensing unit with the vehicle owner. It is important that the owner understands the vehicle may not be perfectly level after every level procedure. Make sure the owner understands how to manually operate the system to make minor level adjustments if desired.**

## 6.) JACK PRESSURE SWITCH ADJUSTMENT AND STABILIZING CHECK

The jack pressure switches only affect the leveling system when it is operated in the automatic mode. The jack pressure switches signal the system processor when the jacks are on the ground for stabilizing after an automatic leveling procedure. The jack pressure switches need to be adjusted so the jacks lift the vehicle ½ to 1 inch when stabilizing.

**Stabilizing Check.**

a.) Move the vehicle to a level location so no yellow level indicator lights are on.
b.) Swing the jacks to the vertical position and/or manually dump the air from the air bags if so equipped.
c.) Manually extend the jacks until they touch the ground but do not lift.
d.) Mark the jack rod at the bottom of the jack barrel with a felt pen.
e.) Start the automatic leveling process.
f.) Check each jack to see how far it lifted the vehicle in the stabilize mode.
g.) Adjust switches and repeat process as necessary.

**Pressure Switch Adjustment.**

The jack pressure switches have a protective rubber boot at the top of the switch. Remove the boot, being careful to not put stress on the wire protruding through the boot. Loosen the jam nut. If the jack needs to lift more, turn the threaded pressure adjust body clockwise. If the jack lifts to far, turn the pressure adjust body counterclockwise. Only make about ¼ turn max. before testing. When the adjustment is complete, make sure to return the rubber boot to its original position. There is a view of the jack pressure switch on the next page.

## 7.) FINAL CHECK LIST

**1.) With all jacks fully retracted, check the oil level. The oil level should be within 1 inch of the top of the reservoir.**

**2.) Check all hose connections for leaks and check hose routings for heat or rubbing issues. Make sure all hoses are fastened or supported properly.**

**3.) Check all wiring connections for tightness and make sure all exposed connections are protected against moisture and corrosion. Check harness routings for heat or rubbing issues Make sure harnesses and wires are fastened or supported properly.**

**4.) Check all mounting bolts and brackets for the jacks, power unit and/or control box are tight.**

**5.) Check that all indicator lights including the master warning light and buzzer (if so equipped) are functioning properly.**

**6.) Run the system with the owner to explain the correct operation and function of the leveling system in both the manual and automatic mode.**

**7.) Make sure the owner receives the owner's manual. Review the manual, especially cautions, with the owner.**

**JACK PRESSURE SWITCH FOR 610 SYSTEMS**

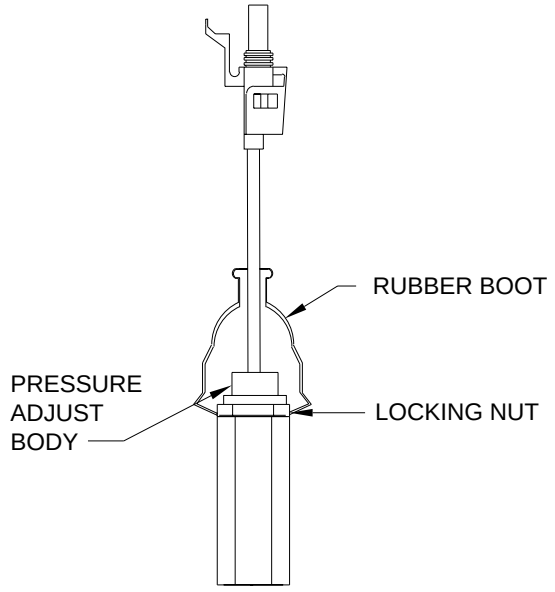



**Figure 21**

**SECTION IV: INSTRUCTION SHEETS - PLUMBING DIAGRAMS - WIRING DIAGRAMS**

**THE FOLLOWING PAGES ARE PLUMBING DIAGRAMS FOR THE HYDRAULIC LINES AND THE HWH AIR DUMP SYSTEM, ELECTRICAL CONNECTION DIAGRAMS AND INSTRUCTION SHEETS FOR THE LEVEL SENSING UNIT PROGRAMMING AND ADJUSTMENT.**

# SECTION IV

# 625/625S SERIES LEVELING SYSTEMS

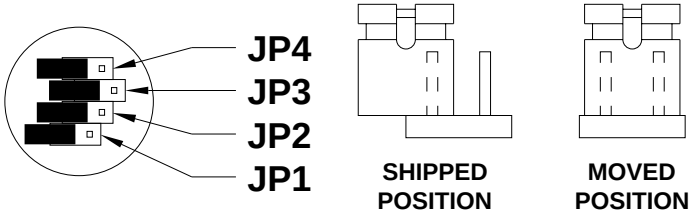
# JUMPER PLACEMENT FOR ELECTRONIC SENSING UNIT

**IMPORTANT: 325 AND 625 ELECTRONIC SENSING UNITS USED IN AFTER MARKET INSTALLATIONS OR REPLACEMENT SITUATIONS ARE PROGRAMMABLE. DURING INSTALLATION OF A SYSTEM OR REPLACEMENT OF AN ELECTRONIC SENSING UNIT DO NOT ASSUME THAT THE SENSING UNIT JUMPERS ARE PRE-SET. THE MOUNTED ORIENTATION OF THE CONTROL BOX ASSEMBLY AND THE SUSPENSION TYPE MUST BE ESTABLISHED IN ORDER TO SET THE JUMPERS AS NEEDED TO PROGRAM THE SENSING UNIT TO THE COACH.**

## JP1 AND JP2 - CONTROL BOX ORIENTATION (Page 1 of 2)

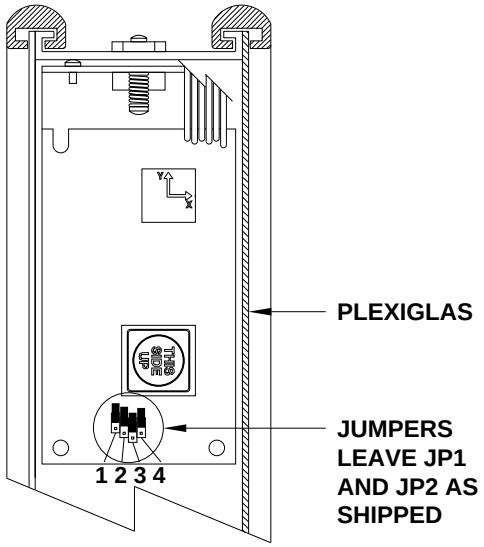
MOVE JUMPERS JP1 AND JP2 ACCORDING TO THE ORIENTATION OF THE CONTROL BOX. USE THE DRAWINGS PROVIDED TO DETERMINE WHICH APPLICATION IS FOR THE ORIENTATION OF YOUR CONTROL BOX.

FOR SHIPPING PURPOSES THE (4) JUMPERS ARE SLID ONTO ONE SIDE OF JP1 THROUGH JP4. MOVE ONLY THE JUMPERS NEEDED TO DETERMINE ORIENTATION AND SUSPENSION. LEAVING THE REMAINING JUMPERS AS THEY ARE SHIPPED WILL NOT CAUSE PROBLEMS.

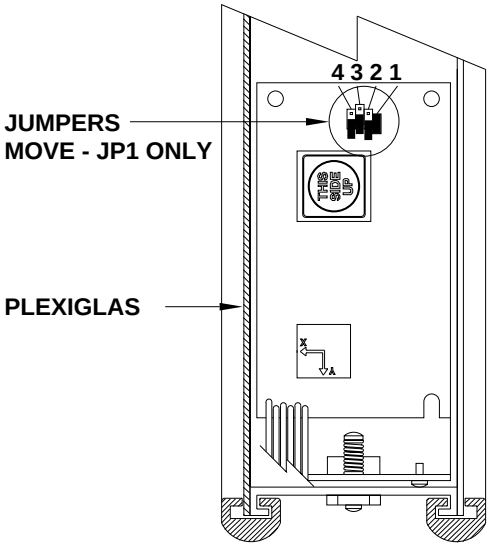



**THE FOLLOWING DRAWINGS SHOW THE SENSING UNIT, INSIDE THE CONTROL BOX, AS VIEWED WHEN LOOKING DOWN FROM THE TOP OF THE CONTROL BOX. REMOVE THE RUBBER RING AND PLASTIC COVER ONLY IF NEEDED. THE RING AND COVER MUST BE REINSTALLED.**

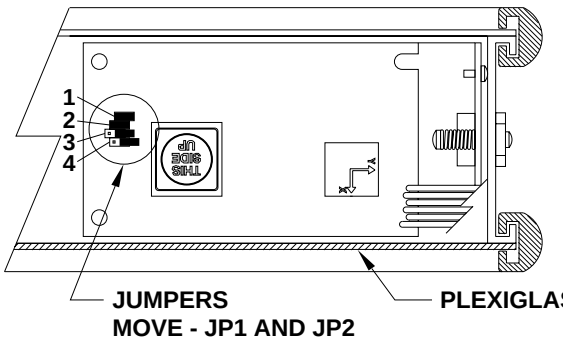
**FRONT OF VEHICLE**



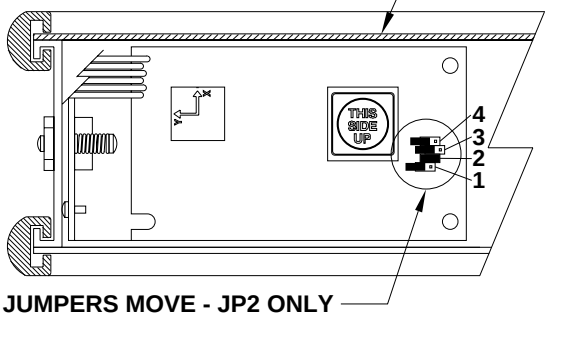

**FRONT OF VEHICLE**




**FRONT OF VEHICLE**




**FRONT OF VEHICLE**




**NOTE: AFTER MOVING THE JUMPERS, REMOVE AND REAPPLY +12 POWER FOR THE CONTROL BOX. THIS WILL "RE-BOOT" THE SENSING UNIT.**

# SECTION IV

# 625/625S SERIES LEVELING SYSTEMS

# JUMPER PLACEMENT FOR ELECTRONIC SENSING UNIT

**IMPORTANT: 325 AND 625 ELECTRONIC SENSING UNITS USED IN AFTER MARKET INSTALLATIONS OR REPLACEMENT SITUATIONS ARE PROGRAMMABLE. DURING INSTALLATION OF A SYSTEM OR REPLACEMENT OF AN ELECTRONIC SENSING UNIT DO NOT ASSUME THAT THE SENSING UNIT JUMPERS ARE PRE-SET. THE MOUNTED ORIENTATION OF THE CONTROL BOX ASSEMBLY AND THE SUSPENSION TYPE MUST BE ESTABLISHED IN ORDER TO SET THE JUMPERS AS NEEDED TO PROGRAM THE SENSING UNIT TO THE COACH.**

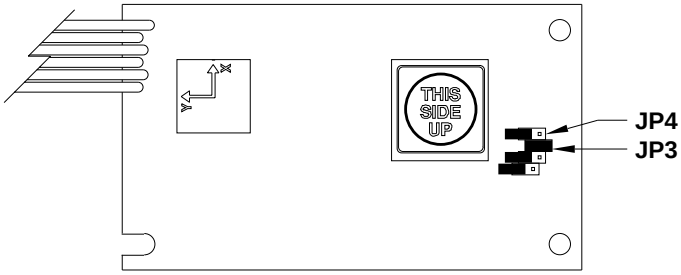
## JP3 AND JP4 - CONTROL SUSPENSION TYPE (Page 2 of 2)

MOVE JUMPERS JP3 AND JP4 ACCORDING TO THE TYPE OF SUSPENSION ON THE VEHICLE.

JUMPERS JP3 AND JP4 DETERMINE SUSPENSION TYPE.

**SPRING -** LEAVE JUMPERS JP3 AND JP4 AS SHIPPED.
NEITHER JUMPER NEEDS TO BE MOVED.

**AIR -** LEAVE JUMPER JP4 AS SHIPPED, MOVE JP3 ONLY.
DIAGRAM BELOW SHOWS AIR SUSPENSION SETUP.



# SECTION IV
# 625/625S SERIES LEVELING SYSTEMS
# LEVEL SENSING UNIT ADJUSTMENT AND ACCURACY TOLERANCE

## SENSING UNIT ACCURACY TOLERANCE

The sensing unit has an accuracy tolerance of ± 5.4 inches front to rear and ± 1 inch side to side on a 36 foot vehicle. Typical leveling results will be better.

## SENSING UNIT ADJUSTMENT

Level the vehicle by placing a bubble level in the center of the freezer floor or upon whichever surface within the vehicle that is to be level. Using the Leveling System and the bubble level, ignoring the yellow LEVEL lights on the Touch Panel, level the vehicle until the bubble is centered.

With the vehicle level according to the bubble level, if there are no yellow lights lit on the Touch Panel, the sensing unit is properly adjusted. If there are yellow LEVEL lights lit on the Touch Panel, manual adjustments to the Sensing Unit are needed. A Phillips screw driver or sockets w/driver or box end wrenches of 7/8, 3/4, 1/2, 5/16 or 1/4 sizes will be needed.

The Sensing Unit is mounted inside the Control Box. The Control Box is mounted to the power unit/valve assembly.

There are four LED's on the Sensing Unit, A,B,C and D. Refer to the drawing below. The Sensing Unit is adjusted by turning the adjustment nut to turn out LED's B and D. The adjustment screw will turn out LED's A and C. If the adjustment nut has to be turned more than 1/2 flat or the adjustment screw has to be turned more than 3/4 turn to turn the LED out, there may be a problem with the Sensing Unit or the mounting of the Control Box. If two LED's are on, it is best to make the B-D adjustments first, then hold the adjustment nut from moving while making the A-C adjustment.

**NOTE: If opposing LED's are lit, there is a problem with the Sensing Unit.**

**If LED (A) is lit: Turn the adjustment screw COUNTER CLOCKWISE until the LED is off.**

**If LED (C) is lit: Turn the adjustment screw CLOCKWISE until the LED is off.**

**If LED (B) is lit: Turn the adjustment nut COUNTER CLOCKWISE until the LED is off.**

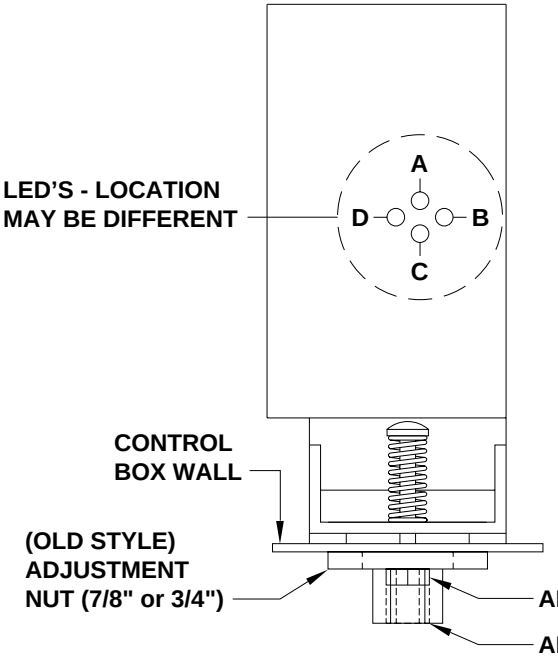
**If LED (D) is lit: Turn the adjustment nut CLOCKWISE until the LED is off.**

**IMPORTANT: When all 4 LED's are off, move the vehicle to an unlevel position so one or two yellow lights are on. Level the vehicle according to the yellow LEVEL lights. Recheck the level. If more adjustment is needed, DO NOT try to adjust the sensing unit until the yellow level lights go out, instead just "tweak" the sensing unit, ignoring the LED's on the sensing unit.**

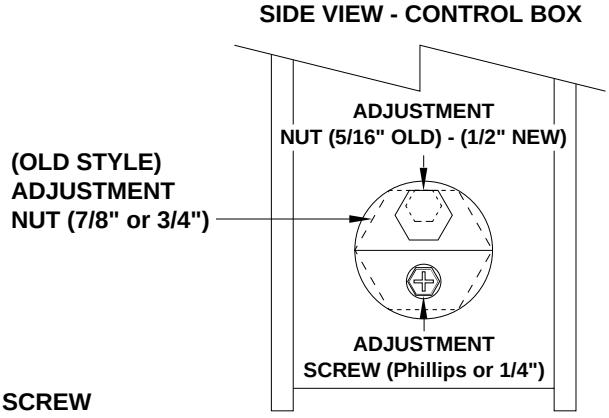
**Example: After the initial adjustment and releveling the vehicle, the front is still low. This means the front yellow level light is turning off too soon. Determine which sensing unit light is the front light, A-B-C or D. Move the adjustment for that light very, very, slightly in the OPPOSITE direction that is given in the above instructions for LED's A, B, C, and D. This will allow the front yellow light to stay on slightly longer to bring the front up more. Again, unlevel the vehicle then relevel the vehicle using the yellow level lights on the touch panel. Recheck with a level. Repeat the "tweaking" process until the system levels the vehicle properly.**

**The operation of the sensing unit should be checked with the vehicle in several different out of level positions.**

**TOP VIEW - SENSING UNIT**

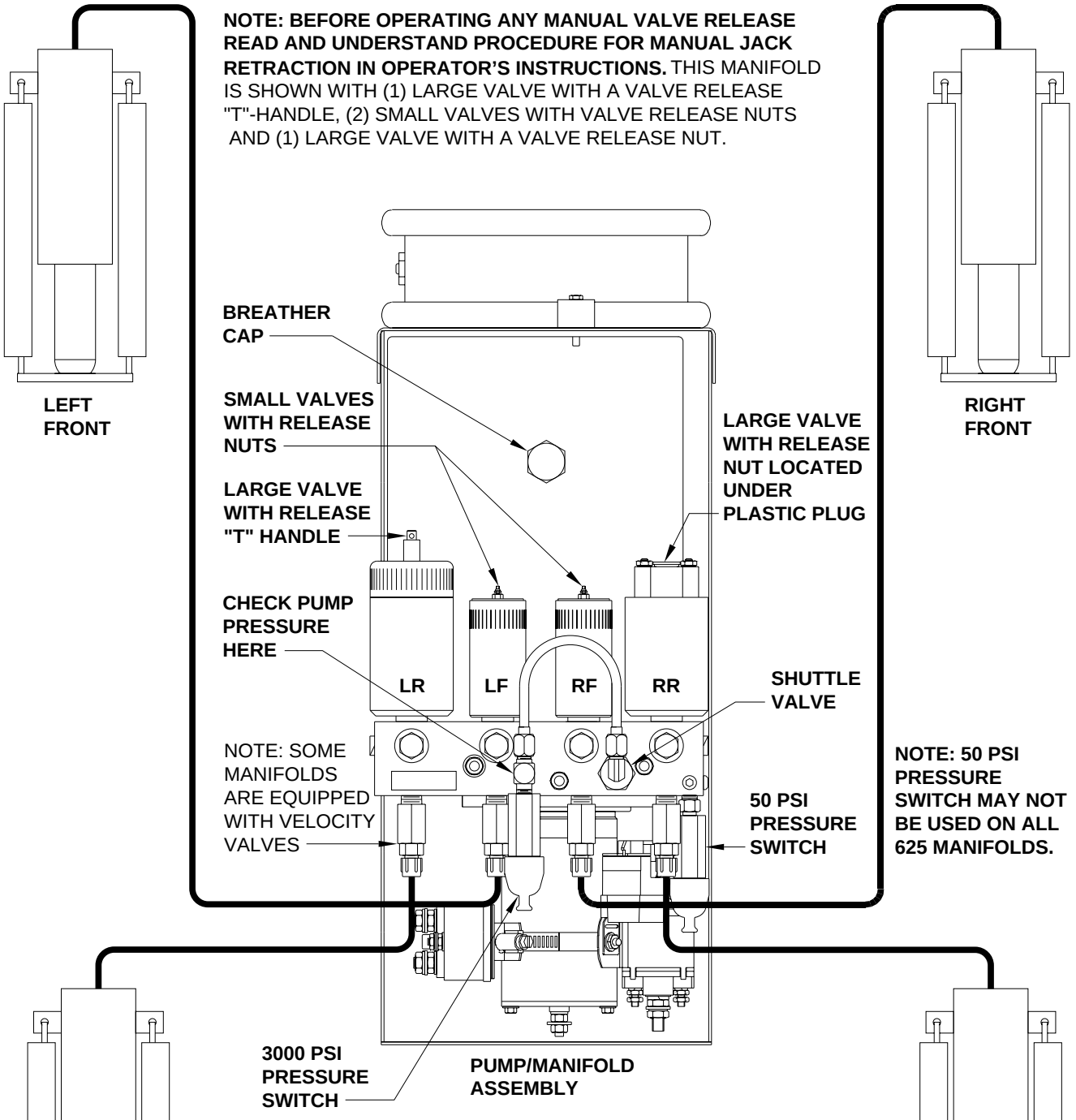



**SIDE VIEW - CONTROL BOX**

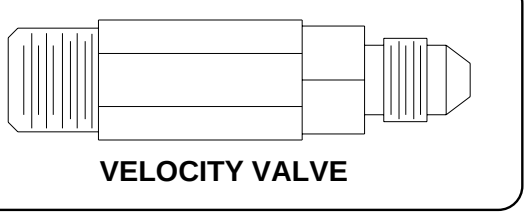


# SECTION IV - HYDRAULIC LINE CONNECTION DIAGRAM
# 625 SERIES LEVELING SYSTEM
# (WITH 4 STRAIGHT-ACTING JACKS)

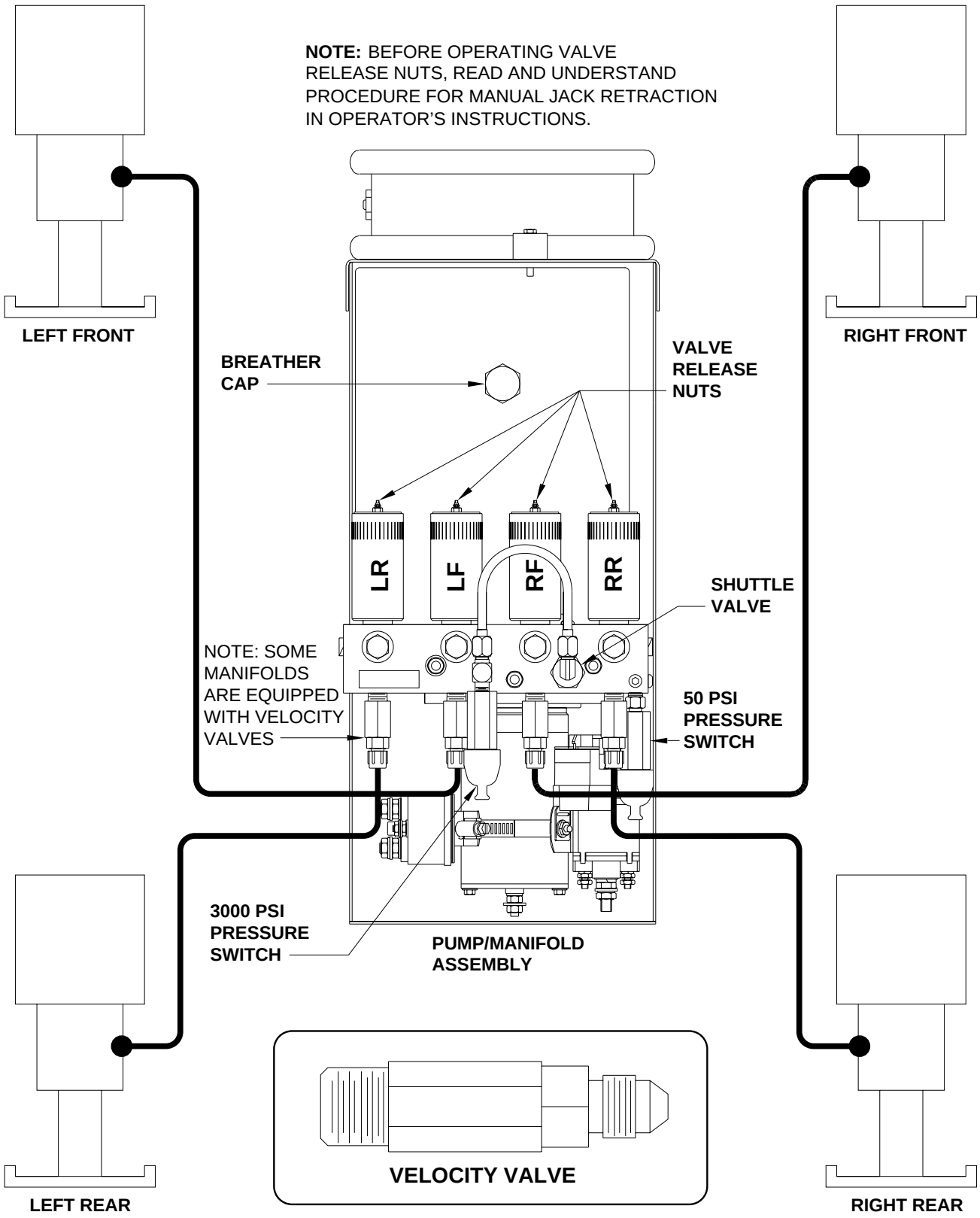
**NOTE: BEFORE OPERATING ANY MANUAL VALVE RELEASE READ AND UNDERSTAND PROCEDURE FOR MANUAL JACK RETRACTION IN OPERATOR'S INSTRUCTIONS.** THIS MANIFOLD IS SHOWN WITH (1) LARGE VALVE WITH A VALVE RELEASE "T"-HANDLE, (2) SMALL VALVES WITH VALVE RELEASE NUTS AND (1) LARGE VALVE WITH A VALVE RELEASE NUT.



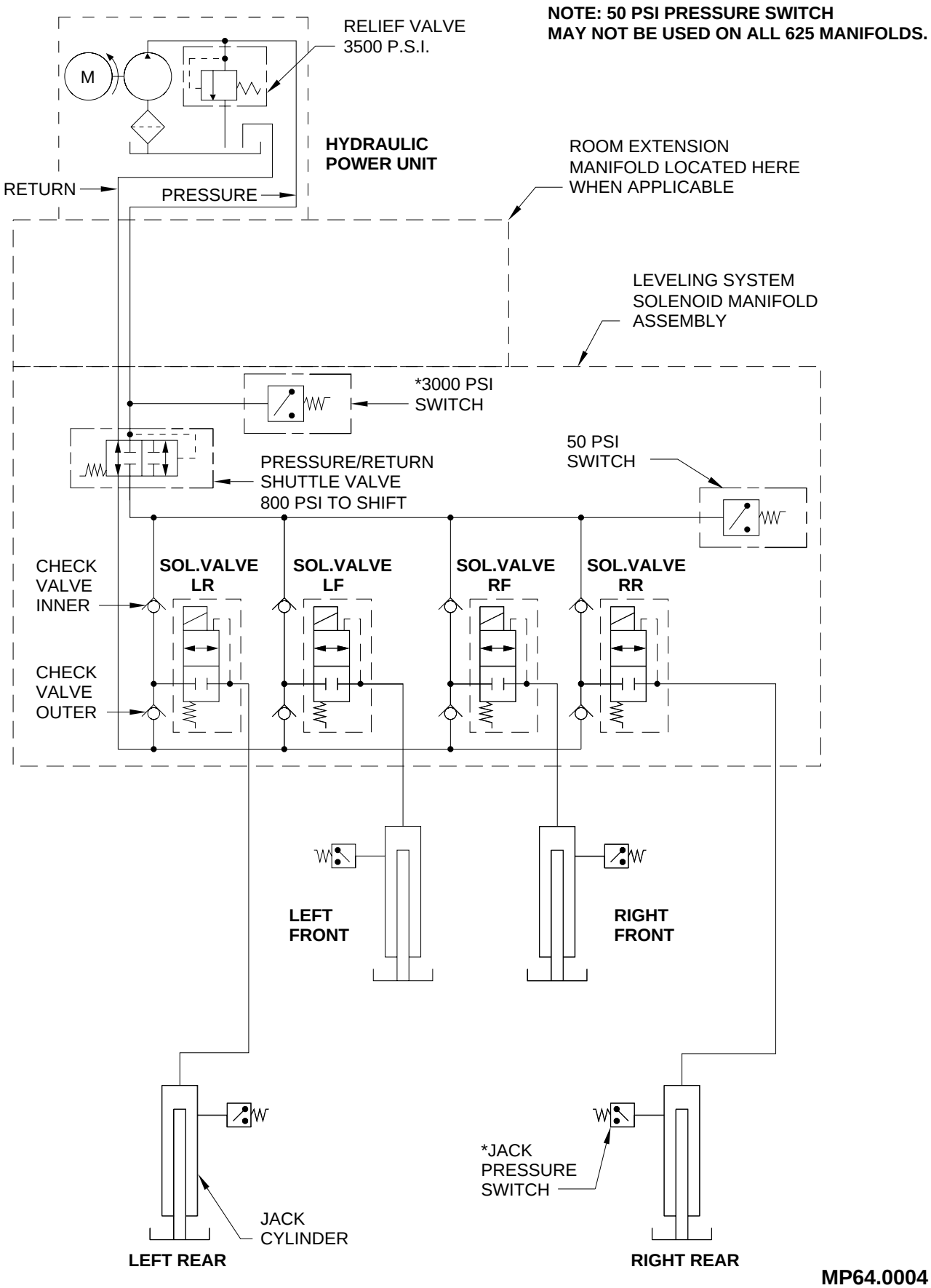

**(ROOM EXTENSION MANIFOLD NOT SHOWN)**



# SECTION IV - HYDRAULIC LINE CONNECTION DIAGRAM
# 625 SERIES LEVELING SYSTEM
# (WITH 4 KICK-DOWN JACKS)

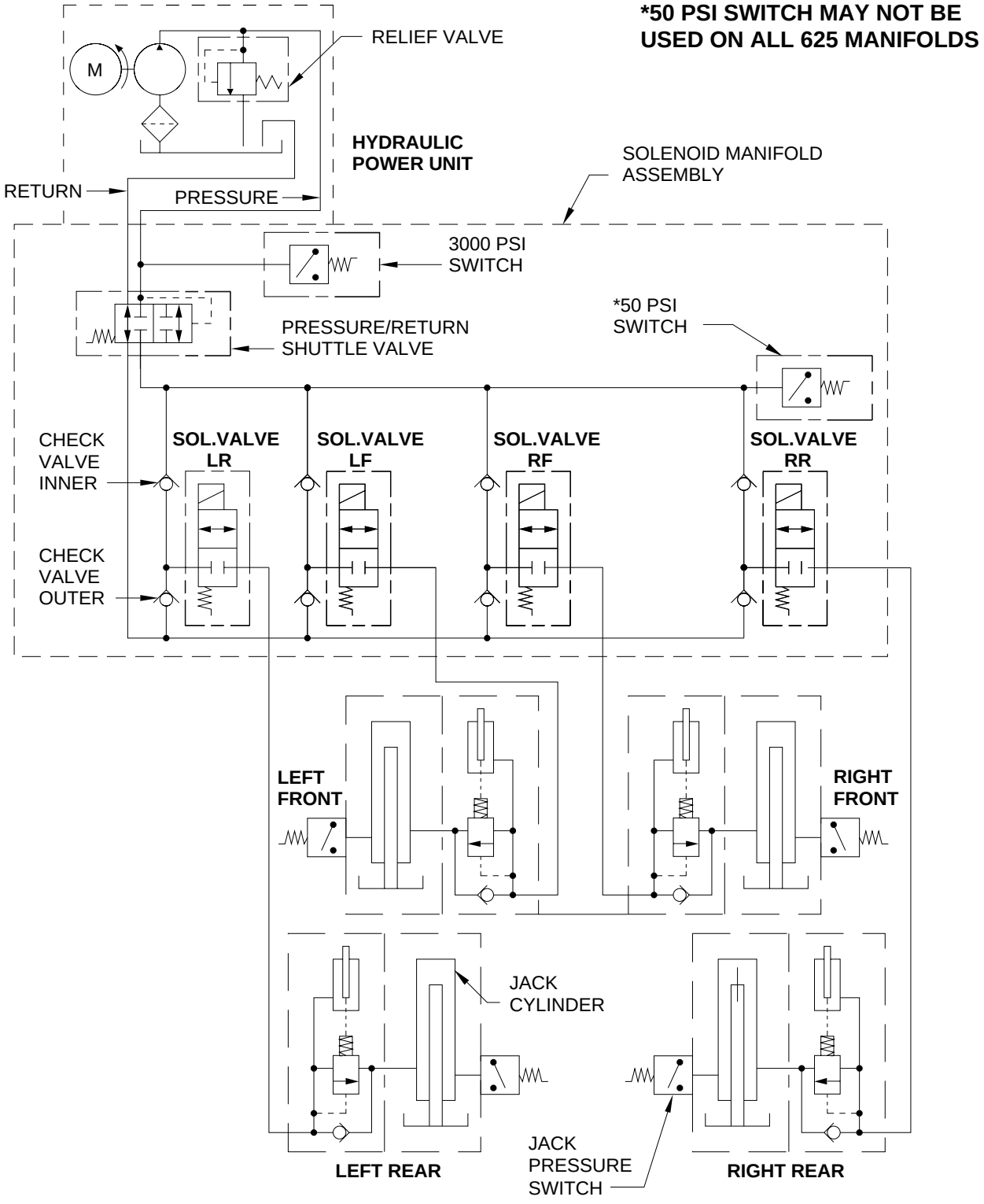


# SECTION IV - HYDRAULIC SCHEMATIC DIAGRAM
# 625 SERIES LEVELING SYSTEM
# BI-AXIS LEVELING WITH STRAIGHT-ACTING JACKS

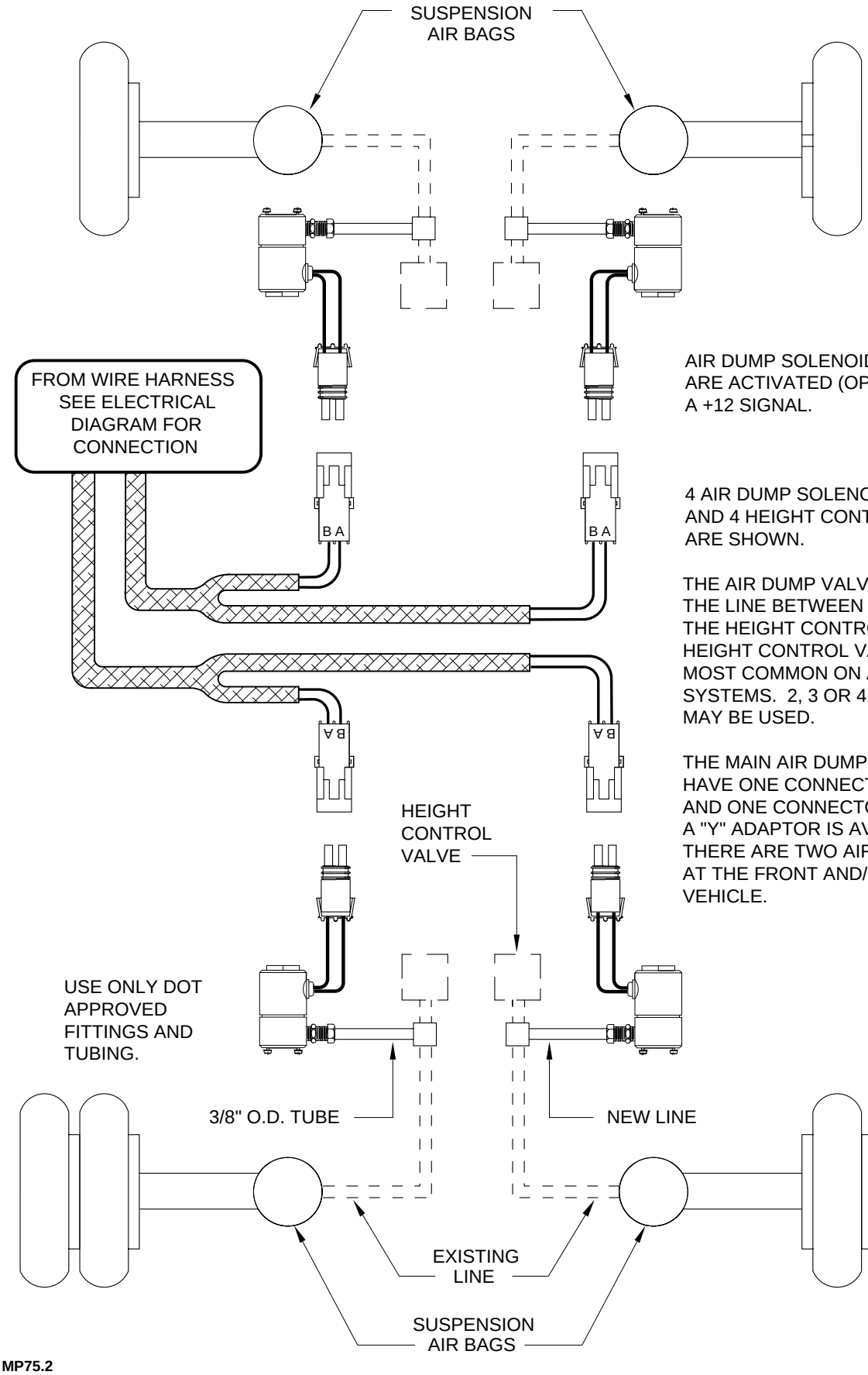



*** USED ON AUTOMATIC SYSTEMS ONLY**

# SECTION IV - HYDRAULIC SCHEMATIC DIAGRAM
# 625 SERIES LEVELING SYSTEM
# BI-AXIS LEVELING WITH KICK-DOWN JACKS



# SECTION IV
# AIR LINE CONNECTION DIAGRAM



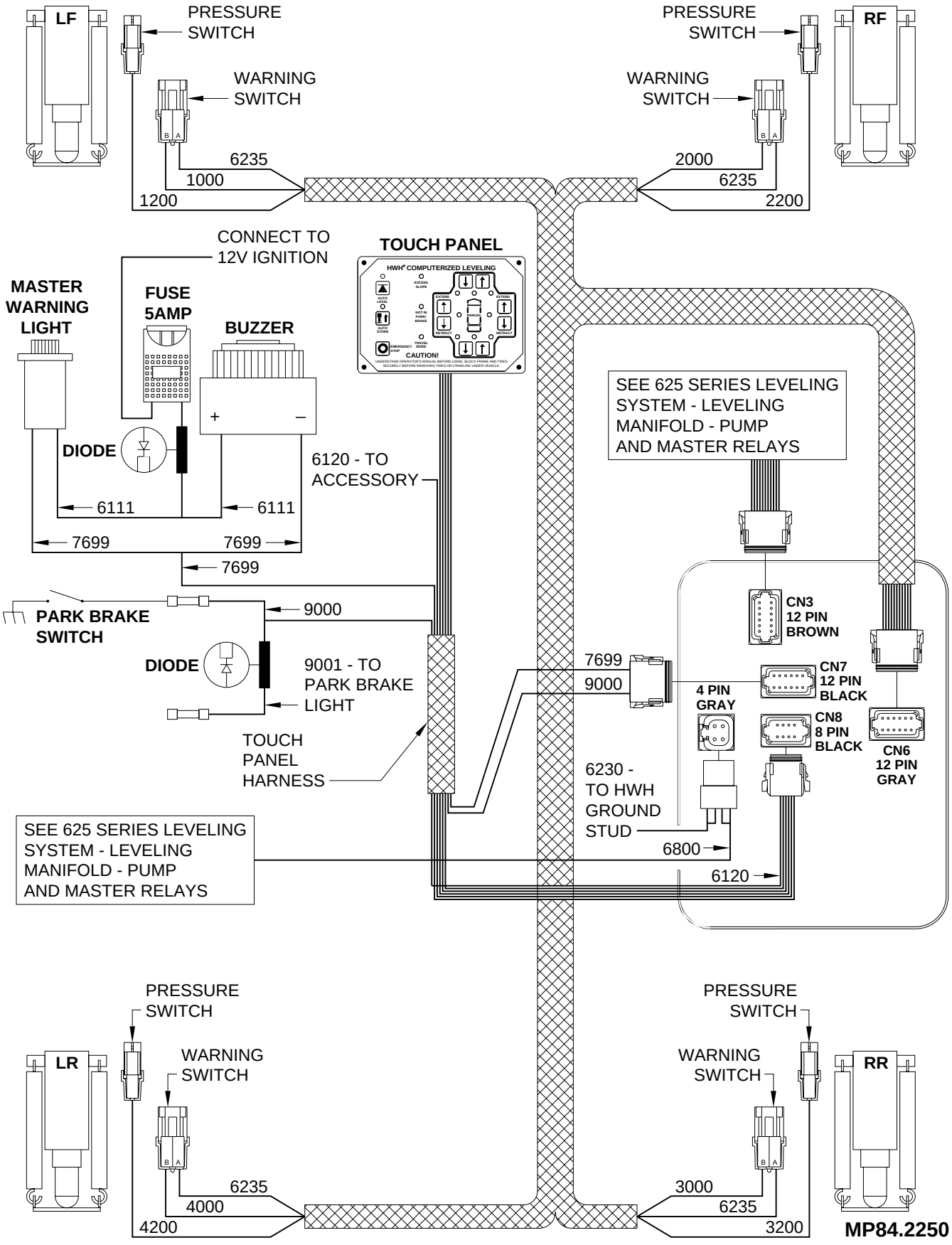

AIR DUMP SOLENOID VALVES ARE ACTIVATED (OPENED) BY A +12 SIGNAL.

4 AIR DUMP SOLENOID VALVES AND 4 HEIGHT CONTROL VALVES ARE SHOWN.

THE AIR DUMP VALVE IS TO TEE INTO THE LINE BETWEEN THE AIR BAG AND THE HEIGHT CONTROL VALVE. THREE HEIGHT CONTROL VALVES ARE THE MOST COMMON ON AIR SUSPENSION SYSTEMS. 2, 3 OR 4 CONTROL VALVES MAY BE USED.

THE MAIN AIR DUMP HARNESS WILL HAVE ONE CONNECTOR AT THE FRONT AND ONE CONNECTOR AT THE REAR. A "Y" ADAPTOR IS AVAILABLE WHEN THERE ARE TWO AIR DUMP VLAVES AT THE FRONT AND/OR REAR OF THE VEHICLE.

# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# SYSTEM DIAGRAM

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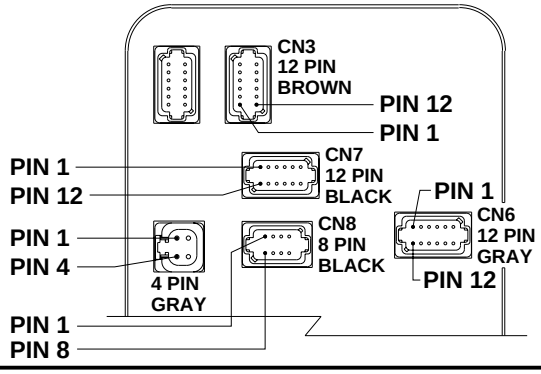
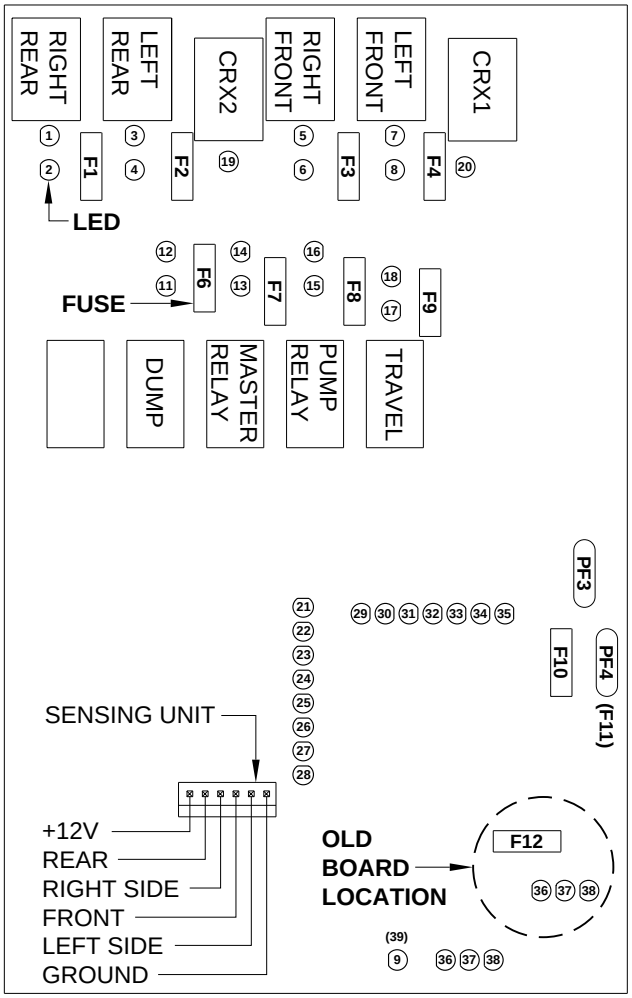
# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# CONTROL BOX CONNECTION INFORMATION




| PIN # | WIRE COLOR | WIRE NUMBER | WIRE DESCRIPTION AND FUNCTION |
|---|---|---|---|
| **4 PIN GRAY CONNECTOR** | | | |
| 1 | BLACK | 6800 | SWITCHED +12V BATTERY POWER FROM MASTER RELAY |
| 2 | BLACK | 6800 | SWITCHED +12V BATTERY POWER FROM MASTER RELAY |
| 3 | WHITE | 6230 | GROUND FROM HWH GROUND STUD |
| 4 | RED | 6100 | +12 BATTERY FROM MASTER RELAY |
| **12 PIN BROWN CONNECTOR - CN3** | | | |
| 1 | BLACK | 8500 | MASTER RELAY CONTROL - SWITCHED +12 |
| 2 | BLACK | 8100 | 3000 LB PRESSURE SWITCH - SWITCHED GROUND |
| 3 | BLACK | 8101 | 50 LB PRESSURE SWITCH - SWITCHED GROUND |
| 4 | BLACK | 9301 | SWITCHED +12 FOR TRAVEL |
| 5 | BLACK | 1400 | SWITCHED +12 FOR LEFT FRONT SOLENOID VALVE |
| 6 | BLACK | 7600 | GROUND FOR RIGHT FRONT SOLENOID VALVE |
| 7 | BLACK | 7601 | GROUND FOR RIGHT REAR SOLENOID VALVE |
| 8 | BLACK | 4400 | SWITCHED +12 FOR LEFT REAR SOLENOID VALVE |
| 9 | BLACK | 3400 | SWITCHED +12 FOR RIGHT REAR SOLENOID VALVE |
| 10 | BLACK | 2400 | SWITCHED +12 FOR RIGHT FRONT SOLENOID VALVE |
| 11 | BLACK | 9300 | SWITCHED +12 FOR DUMP |
| 12 | BLACK | 8600 | PUMP RELAY CONTROL - SWITCHED +12 |
| **12 PIN BLACK CONNECTOR - CN7** | | | |
| 1 THRU 6 | | | NO CONNECTION |
| 7 | BLACK | 9000 | SWITCHED GROUND FROM PARK BRAKE SWITCH |
| 8 THRU 10 | | | NO CONNECTION |
| 11 | BLACK | 7699 | BUZZER & MASTER WARNING LIGHT CONTROL - SWITCHED GROUND |
| 12 | | | NO CONNECTION |
| **8 PIN BLACK CONNECTOR - CN8** | | | |
| 1 AND 2 | | | NO CONNECTION |
| 3 | RED | 6800 | SWITCHED BATTERY |
| 4 | WHITE | 6230 | GROUND |
| 5 | | | CAN SHIELD |
| 6 | RED | 6120 | +12 ACCESSORY / IGNITION |
| 7 | GREEN | | CAN LOW |
| 8 | YELLOW | | CAN HIGH |
| **12 PIN GRAY CONNECTOR - CN6** | | | |
| 1 AND 2 | | | NO CONNECTION |
| 3 | BLACK | 1000 | SWITCHED GROUND FROM LEFT FRONT WARNING SWITCH |
| 4 | BLACK | 2000 | SWITCHED GROUND FROM RIGHT FRONT WARNING SWITCH |
| 5 | BLACK | 1200 | SWITCHED GROUND FROM LEFT FRONT PRESSURE SWITCH |
| 6 | BLACK | 2200 | SWITCHED GROUND FROM RIGHT FRONT PRESSURE SWITCH |
| 7 | BLACK | 3200 | SWITCHED GROUND FROM RIGHT REAR PRESSURE SWITCH |
| 8 | BLACK | 4200 | SWITCHED GROUND FROM LEFT REAR PRESSURE SWITCH |
| 9 | BLACK | 3000 | SWITCHED GROUND FROM RIGHT REAR WARNING SWITCH |
| 10 | BLACK | 4000 | SWITCHED GROUND FROM LEFT REAR WARNING SWITCH |
| 11 | | | NO CONNECTION |
| 12 | WHITE | 6235 | SHARED GROUND FOR WARNING SWITCHES |

# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# CONTROL BOX - LED - FUSE LOCATION AND DESCRIPTION




| LED | RELAY DESCRIPTION | FUSE |
|---|---|---|
| 1-YELLOW | RIGHT REAR COIL | |
| 2-RED | RIGHT REAR OUTPUT | F1 - 15 AMP |
| 3-YELLOW | LEFT REAR COIL | |
| 4-RED | LEFT REAR OUTPUT | F2 - 15 AMP |
| 5-YELLOW | RIGHT FRONT COIL | |
| 6-RED | RIGHT FRONT OUTPUT | F3 - 15 AMP |
| 7-YELLOW | LEFT FRONT COIL | |
| 8-RED | LEFT FRONT OUTPUT | F4 - 15 AMP |
| 11-YELLOW | DUMP COIL | |
| 12-RED | DUMP OUTPUT | F6 - 5 AMP |
| 13-YELLOW | MASTER RELAY COIL | |
| 14-RED | MASTER RELAY OUTPUT | F7 - 5 AMP |
| 15-YELLOW | PUMP COIL | |
| 16-RED | PUMP OUTPUT | F8 - 5 AMP |
| 17-YELLOW | TRAVEL COIL | |
| 18-RED | TRAVEL OUTPUT | F9 - 5 AMP |
| 19-YELLOW | CRX 2 | |
| 20-YELLOW | CRX 1 | |
| 21-YELLOW | LEFT FRONT WARN SW | |
| 22-YELLOW | RIGHT FRONT WARN SW | |
| 23-YELLOW | RIGHT REAR WARN SW | |
| 24-YELLOW | LEFT REAR WARN SW | |
| 25-RED | LEFT FRONT PRESS SW | |
| 26-RED | RIGHT FRONT PRESS SW | |
| 27-RED | RIGHT REAR PRESS SW | |
| 28-RED | LEFT REAR PRESS SW | |
| 29-RED | NOT USED | |
| 30-YELLOW | NOT USED | |
| 31-GREEN | 3000 LB PRESS SW INPUT | |
| 32-RED | MASTER WARN CONTROL | |
| 33-GREEN | 50 LB PRESS SW INPUT | |
| 34-RED | JACK INTERRUPT | |
| 35-RED | PARK BRAKE | |
| 36-RED | BOARD ENABLE | |
| 37-RED | ACCESSORY IN | F10 - 10 AMP |
| 38-RED | ACCESSORY OUT FOR MASTER WARNING | PF4 (F11) |
| (39) 9-RED | LINK LIGHT | |

**NOTE: FOR DETAILED INPUT / OUTPUT INFORMATION ABOUT PIN CONNECTIONS SEE ELECTRICAL CONNECTION DIAGRAM - CONTROL BOX CONNECTION INFORMATION.**

**NOTE: A LIT YELLOW LED INDICATES THERE IS A GROUND SIGNAL TO TURN THE CORRESPONDING RELAY ON.**

**A LIT RED LED INDICATES THERE IS VOLTAGE ON IT'S CORRESPONDING OUTPUT PIN.**

**IF A YELLOW LED IS LIT AND THE CORRESPONDING RED LED IS OFF, EITHER IT'S FUSE IS BLOWN OR THE RELAY IS BAD.**

**IF THE YELLOW LED'S ARE WORKING BUT NO RED LED IS COMING ON THERE MAY BE PROBLEM WITH INPUT VOLTAGE IN THE 4-PIN CONNECTOR.**

**IF A YELLOW LED IS NOT LIT, THERE IS A PROBLEM WITH THE CONTROL BOX, TOUCH PANEL OR CONNECTION CABLE.**

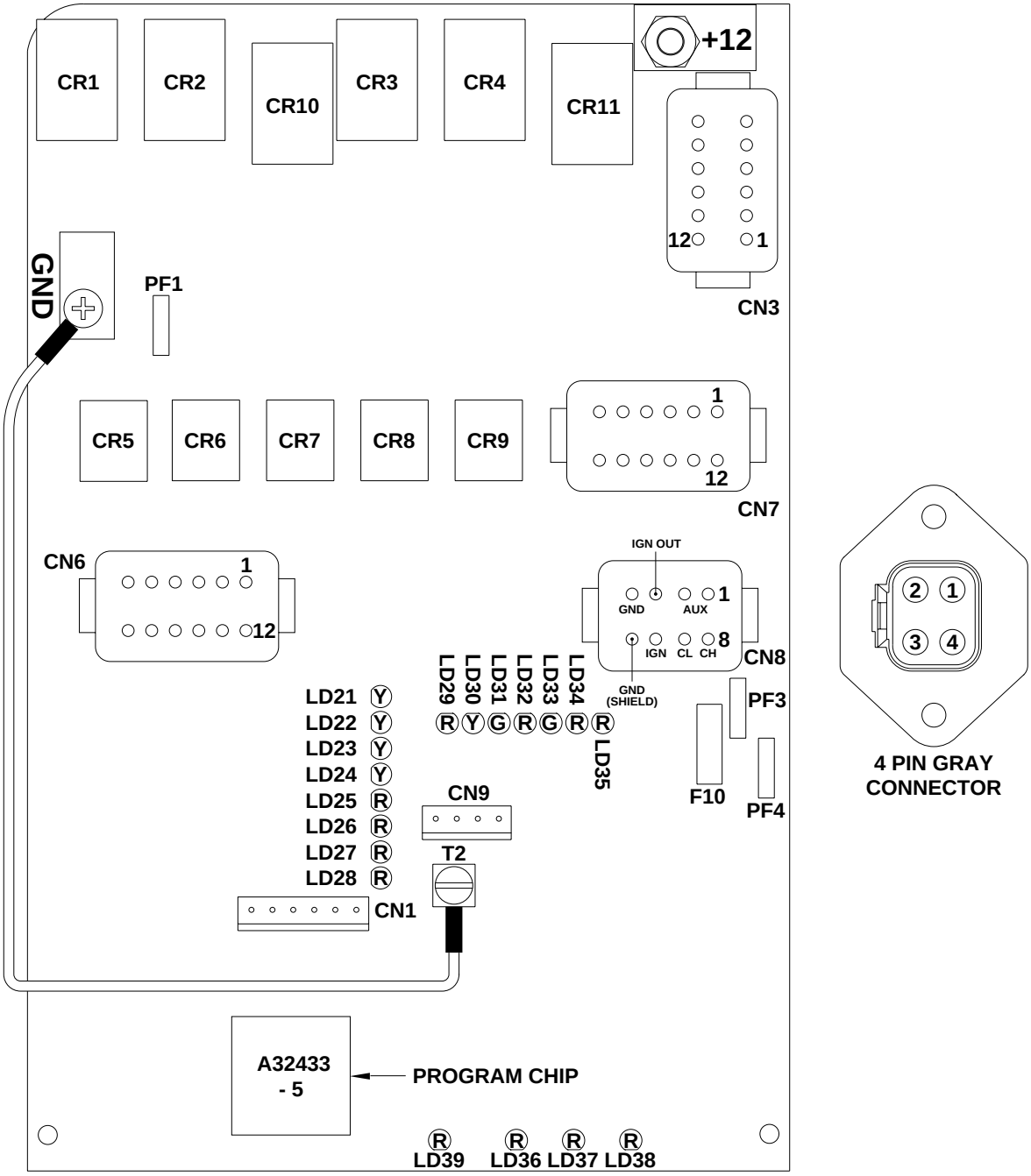
**LED'S 19 AND 20 (YELLOW) WILL BE ON WHENEVER THE TOUCH PANEL IS ON UNLESS THE "STORE" BUTTON IS PUSHED. TWO SECONDS AFTER THE "STORE" BUTTON IS PUSHED, LED's 7 AND 20 WILL TURN OFF. 5 SECONDS LATER LED'S 3 AND 19 WILL TURN OFF.**

**NOTE: THE TRAVEL RELAY IS WIRED AS A NORMALLY CLOSED RELAY. WHEN THE YELLOW LED (17) IS ON THE RELAY CONTACTS WILL OPEN. THE RED LED (18) WILL NOT BE ON. THE RED LED WILL BE ON IF THE LEVELING SYSTEM IS IN THE TRAVEL MODE AND THE IGNITION IS ON.**

**NOTE: THE TRAVEL RELAY IS NOT USED ON VEHICLES EQUIPPED WITH HWH AIR DUMP SYSTEMS. IT IS ONLY USED WITH PILOT OPERATED AIR DUMP SYSTEMS.**

**NOTE: ON NEWER CONTROL BOXES, FUSE F11 AND FUSE F12 HAVE BEEN REPLACED WITH POLY SWITCHES PF4 AND PF3. POLY SWITCHES PROTECT A COMPONENT OR WIRE AS A FUSE DOES EXCEPT THE POLY SWITCH WILL ALLOW CURRENT THROUGH WHEN THE OVERLOAD OR SHORT IS REMOVED. POLY SWITCHES ARE NOT REPLACEABLE.**

# SECTION IV
# ELECTRICAL CONNECTION DIAGRAM
# CIRCUIT BOARD CONNECTOR AND PIN LOCATIONS

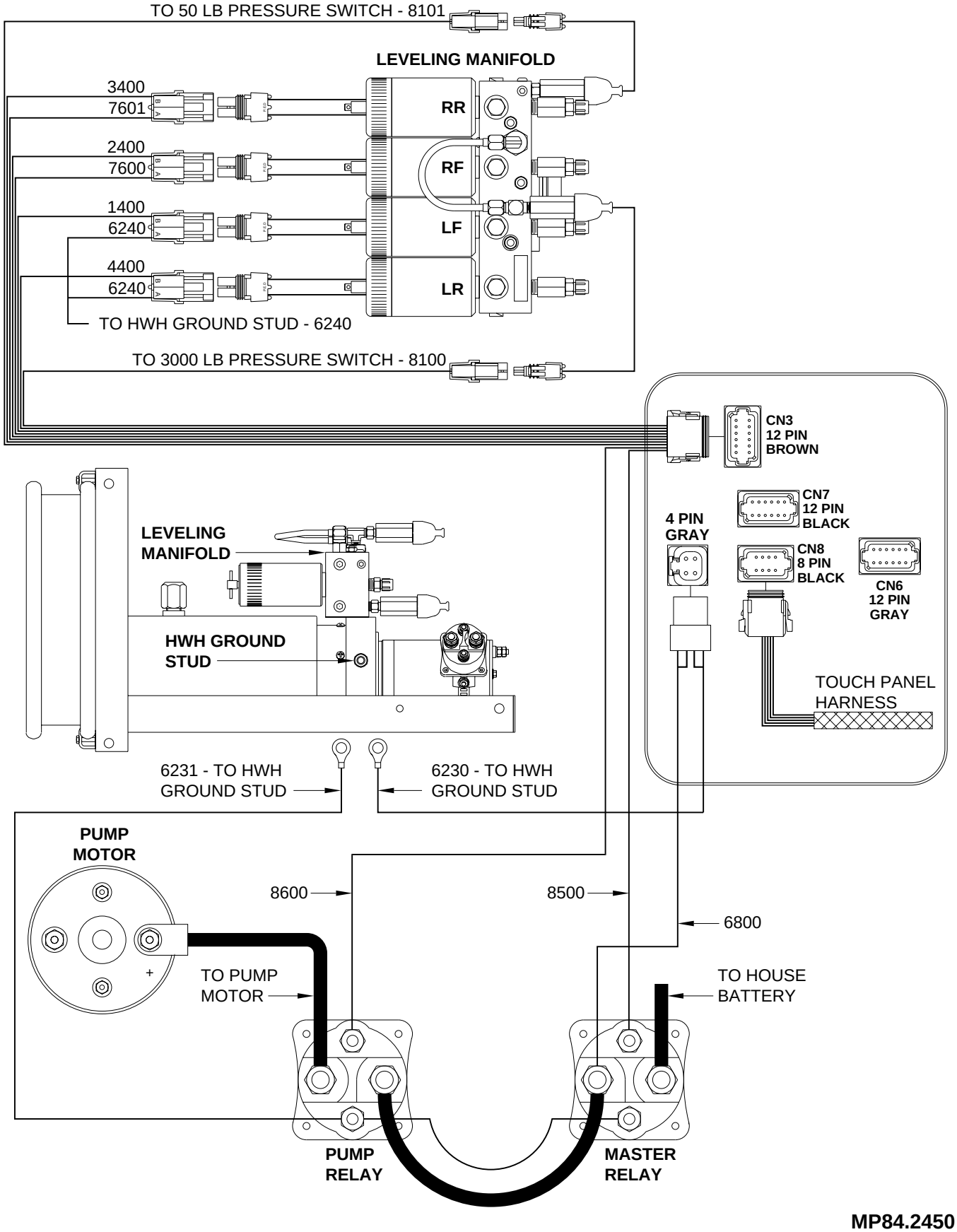




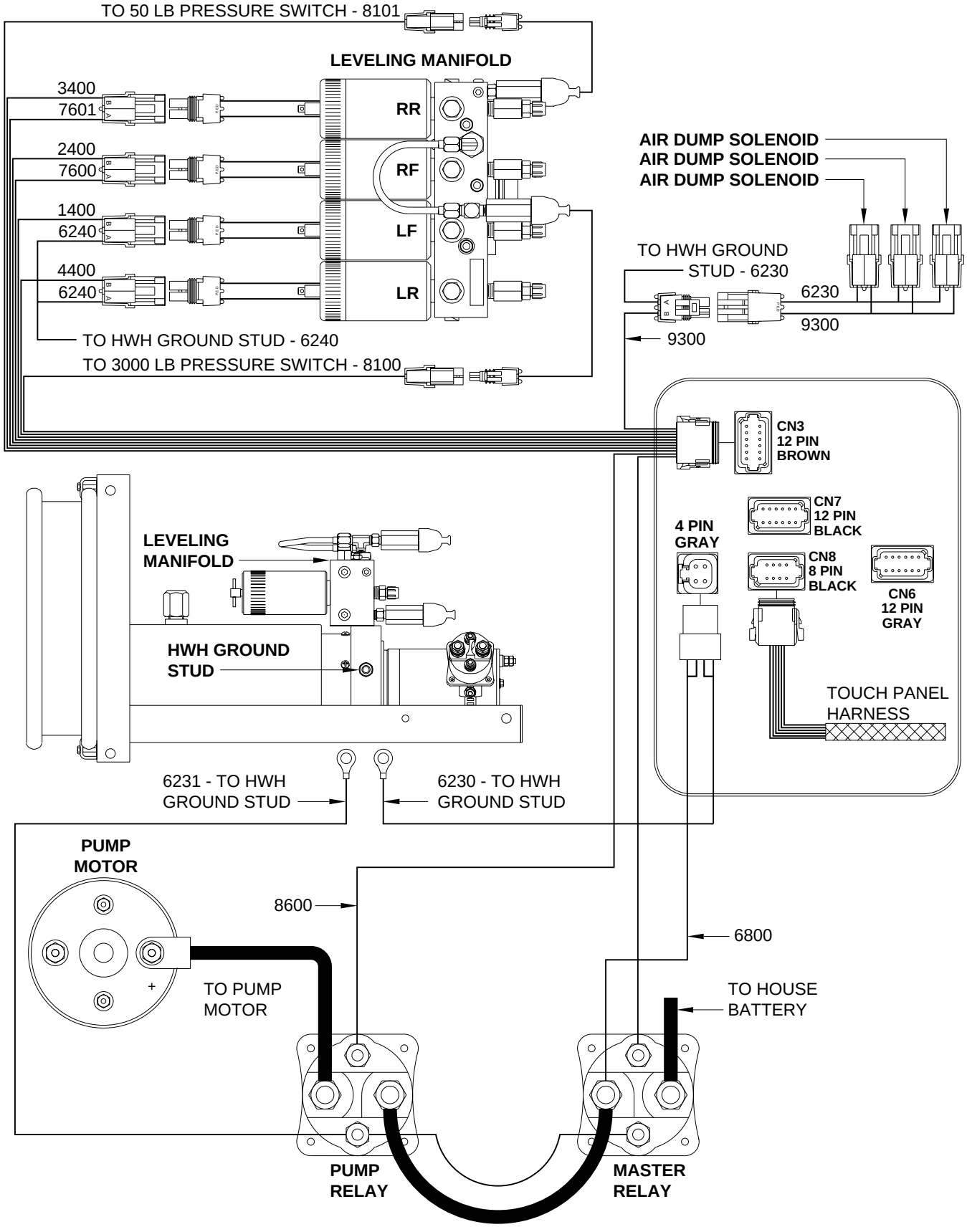


4 PIN GRAY CONNECTOR

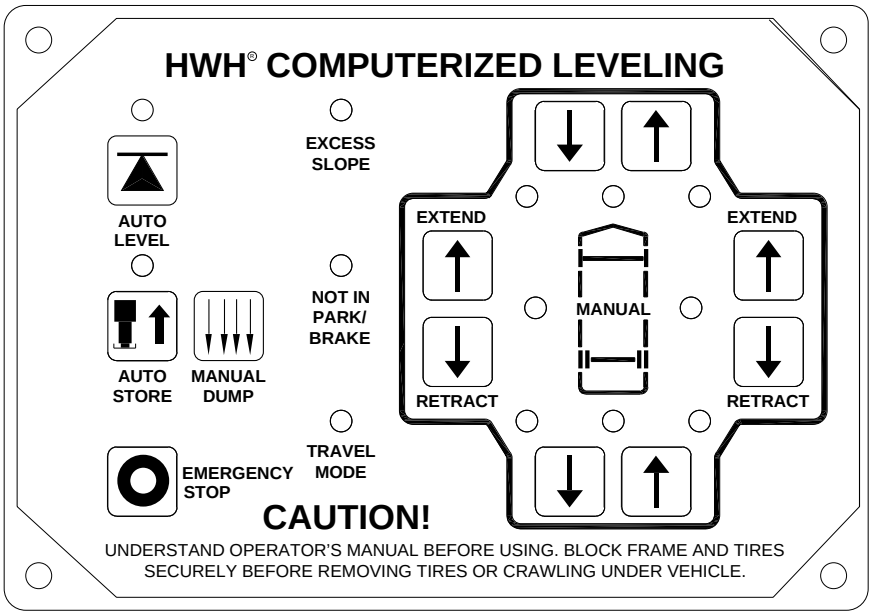
# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# LEVELING MANIFOLD - PUMP AND MASTER RELAYS

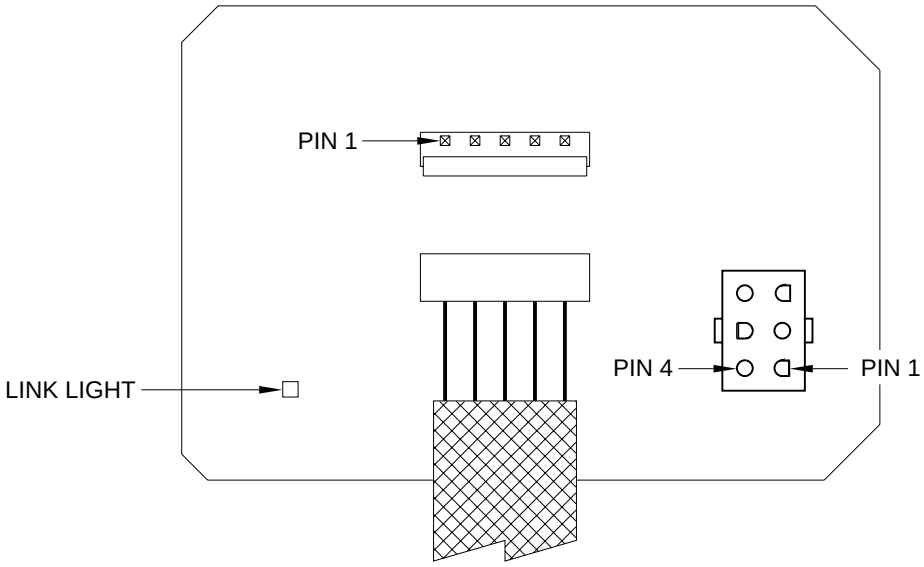


# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# LEVELING MANIFOLD - AIR DUMP - PUMP AND MASTER RELAYS



# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# TOUCH PANEL CONNECTIONS




| PIN # | WIRE COLOR | WIRE NUMBER | WIRE DESCRIPTION AND FUNCTION |
|---|---|---|---|
| **5 PIN MTA CONNECTOR** | | | |
| 1 | YELLOW | | CAN HIGH |
| 2 | GREEN | | CAN LOW |
| 3 | | | CAN SHIELD |
| 4 | WHITE | 6230 | GROUND FROM CONTROL BOX |
| 5 | RED | 6800 | +12V ACC. POWER FROM CONTROL BOX |
| **6 PIN UML CONNECTOR** | | | |
| 1 | | NO CONNECTION | |
| 2 | | ACCESSORY | +12V ACC FROM TOUCH PANEL |
| 3 | | STORE | SW +12V FROM SW TO TOUCH PANEL FOR STORE |
| 4 | | LED | SW GND FROM TOUCH PANEL FOR LEVEL LED |
| 5 | | NO CONNECTION | |
| 6 | | LEVEL | SW +12V FROM SW TO TOUCH PANEL FOR LEVEL |

# SECTION IV - ELECTRICAL CONNECTION DIAGRAM
# 625 OR 625S SERIES LEVELING SYSTEM
# MASTER LIGHT/BUZZER CONNECTIONS

A MASTER WARNING INDICATOR SHOULD ALWAYS BE USED. WHEN THE LEVELING SYSTEM HAS STRAIGHT ACTING JACKS A WARNING BUZZER MUST BE USED.

WHEN ONLY A RED MASTER WARNING LIGHT IS USED THE (+) VOLTAGE FOR THE LIGHT COMES FROM THE CONTROL BOX. (SEE FIGURE 1 BELOW). WHEN BOTH A RED LIGHT AND WARNING BUZZER ARE USED THE (+) VOLTAGE FOR BOTH INDICATORS IS SUPPLIED BY THE IGNITION SWITCH. THE POWER MUST COME FROM THE "ON" SIDE OF THE IGNITION SWITCH, NOT THE "ACC" SIDE. (SEE FIGURE 2 BELOW)

**NOTE :** BY SUPPLYING IGNITION POWER TO THE WARNING BUZZER AND LIGHT, AND "ACC" POWER TO THE CONTROL PANEL, THE SYSTEM MAY BE OPERATED IN ACCESSORY WITHOUT THE BUZZER SOUNDING. THE NEGATIVE SIGNAL FOR THE WARNING INDICATORS MUST ALWAYS COME FROM THE CONTROL BOX.

**CAUTION:** THE 6121 WIRE IN THE MASTER WARNING LIGHT HARNESS IS HOT WHENEVER THE IGNITION IS "ON" OR "ACC". THE 6121 WIRE (IF PRESENT) MUST BE REMOVED FROM THE HARNESS WHEN USING DIRECT IGNITION VOLTAGE FOR THE MASTER WARNING INDICATORS.

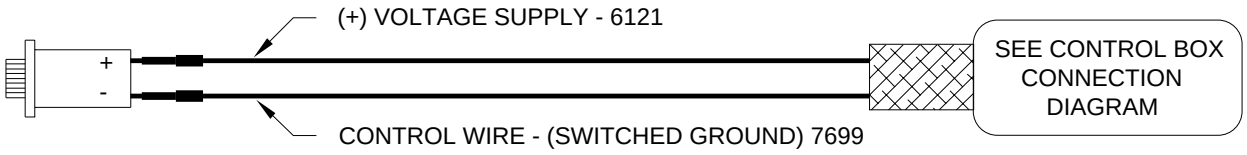



**FIGURE 1**

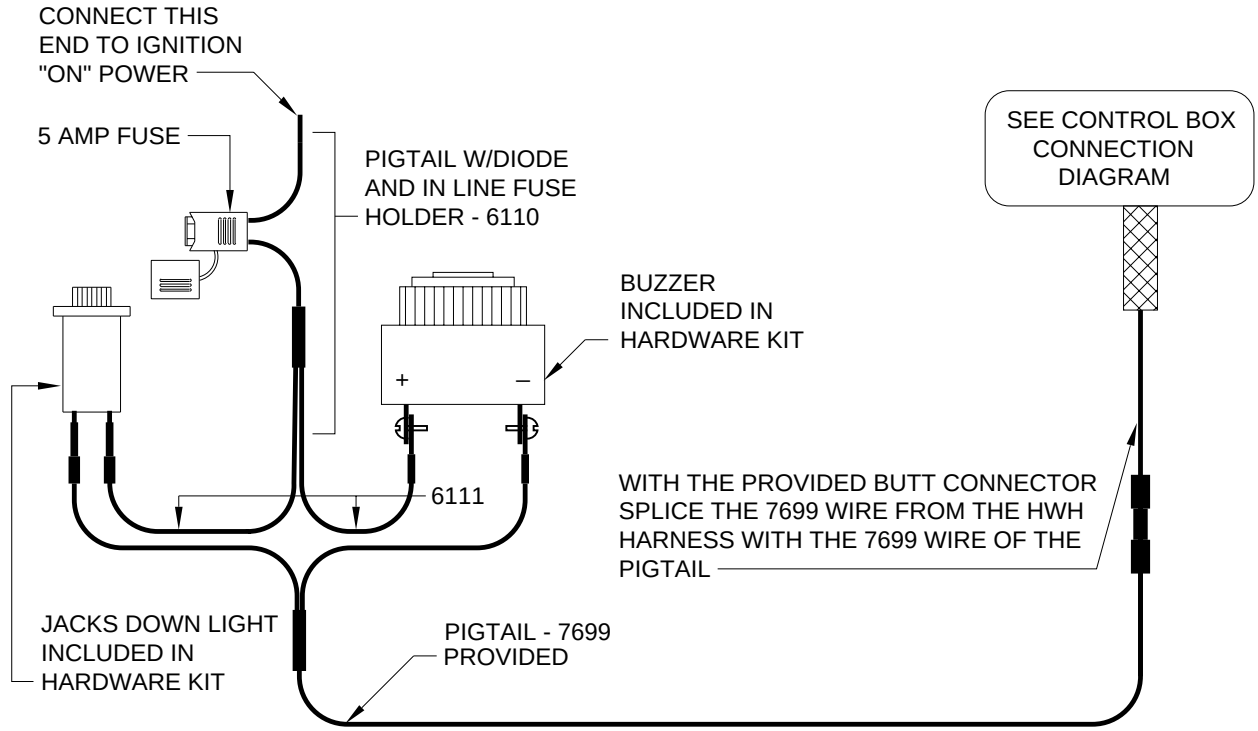

CONNECT THIS END TO IGNITION "ON" POWER
5 AMP FUSE
PIGTAIL W/DIODE AND IN LINE FUSE HOLDER - 6110
SEE CONTROL BOX CONNECTION DIAGRAM
BUZZER INCLUDED IN HARDWARE KIT
+
–
6111
WITH THE PROVIDED BUTT CONNECTOR SPLICE THE 7699 WIRE FROM THE HWH HARNESS WITH THE 7699 WIRE OF THE PIGTAIL
JACKS DOWN LIGHT INCLUDED IN HARDWARE KIT
PIGTAIL - 7699 PROVIDED

**FIGURE 2**